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United States  
Department of  
Agriculture

Forest Service

Tongass National Forest

R10-MB-484b

July 2003



# Licking Creek Timber Sale

## Final Environmental Impact Statement



Cover photo credit: Sheila Spores, USDA Forest Service, Ketchikan-Misty Fiords Ranger District



United States  
Department of  
Agriculture

Forest  
Service

Alaska Region  
Tongass National  
Forest

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File Code: 1950  
Date: July 30, 2003

Dear Reviewer:

Enclosed is your copy of the Final Environmental Impact Statement (Final EIS) for the Licking Creek Timber Sale project area on the Ketchikan-Misty Fiords Ranger District, Tongass National Forest.

The Final EIS proposes five action alternatives for harvesting timber and one no-action alternative. The action alternatives would make approximately 5.4 to 16.8 million board feet (MMBF) of timber available for harvest in the Licking Creek project area. Proposed harvest methods include even-aged and uneven-aged management.

The Record of Decision (ROD) will document my final decision on the Selected Alternative, and the facts considered in reaching the decision. The effective date of implementation for the decision and the Notice of Rights of Appeal are also specified in the ROD.

Copies of this Final EIS are available for review at Forest Service offices throughout the Tongass. Additional copies may be obtained by contacting the the Ketchikan-Misty Fiords Ranger District at 907-225-2148.

I want to thank those of you who took the time to review and comment on the Draft Environmental Impact Statement. Your interest in the management of the Tongass National Forest is appreciated.

Sincerely,

THOMAS PUCHLERZ  
Forest Supervisor





# Licking Creek Timber Sale

## Final Environmental Impact Statement

United States Department of Agriculture  
Forest Service Alaska Region

**Lead Agency:** USDA Forest Service  
Tongass National Forest

**Responsible Official:** Forest Supervisor  
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### Abstract

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The USDA Forest Service proposes to harvest up to approximately 33,556 CCF (16.8 MMBF) of timber in the Licking Creek project area, Ketchikan-Misty Fiords Ranger District, Tongass National Forest. The actions analyzed in this Final Environmental Impact Statement (EIS) are designed to implement direction contained in the Tongass Land Management Plan (Forest Plan). The Final EIS describes six alternatives which provide different combinations of resource outputs and spatial locations of harvest units. The alternatives include: 1) No Action, proposing no new harvest from the project area at this time; 2) minimize potential effects to wildlife, watersheds, and scenery, while providing 10,709 CCF (5.4 MMBF) of timber harvest; 3) locate units to minimize harvest on critical deer winter range and wildlife habitats, harvest 23,832 CCF (11.9 MMBF) of timber; 4) Preferred Alternative, configure harvest units to emphasize timber sale economics, harvest 33,556 CCF (16.8 MMBF) of timber; 5) build no new roads on the project area, while providing 32,261 CCF (16.1 MMBF) of timber harvest, and 6) build no new roads on the project area, using only cable yarding and shovel yarding, harvest 11,118 CCF (5.6 MMBF) of timber.

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# Summary





# Summary

## Purpose and Need for Action

The Forest Service has prepared a Final Environmental Impact Statement (EIS) on the effects of a proposed timber sale in the Licking Creek project area of the Ketchikan-Misty Fjords Ranger District, Tongass National Forest (Figure S-1). The timber from this project would be offered in one or more sales beginning in 2003.

The Licking Creek project area is northeast of the community of Ketchikan in the southeast corner of Alaska (Figure S-1). It is located on Revillagigedo (Revilla) Island, on the eastern shore of Carroll Inlet. Currently, it is accessible only by water or air. National Forest System lands encompass the majority of the 14,424-acre project area, with a small private holding in the southern portion. Cape Fox Corporation holds industrial timberlands outside of the project area, on the southwestern portion of Carroll Inlet and nearby George Inlet.

Our initial proposal was to contract for harvest approximately 19 million board feet (MMBF) of timber from 900 acres of National Forest System land, and construct approximately 5 miles of new road. The timber would be transported to an existing log transfer facility at Shoal Cove. This became Alternative 4 in our environmental analysis, and is the Preferred Alternative. Under this alternative, we propose to harvest approximately 16.8 MMBF of timber from 790 acres, and construct approximately 5.5 miles of new road.

The proposed timber harvest is intended to move the project area toward desired conditions, as they were identified in the 1997 Tongass Land and Resource Management Plan (Forest Plan). The Forest Plan allocated National Forest System lands to land use designations (LUDs), and identified Goals, Standards and Guidelines, and Management Prescriptions for these LUDs. We achieve the desired conditions by applying these prescriptions on the landscape.

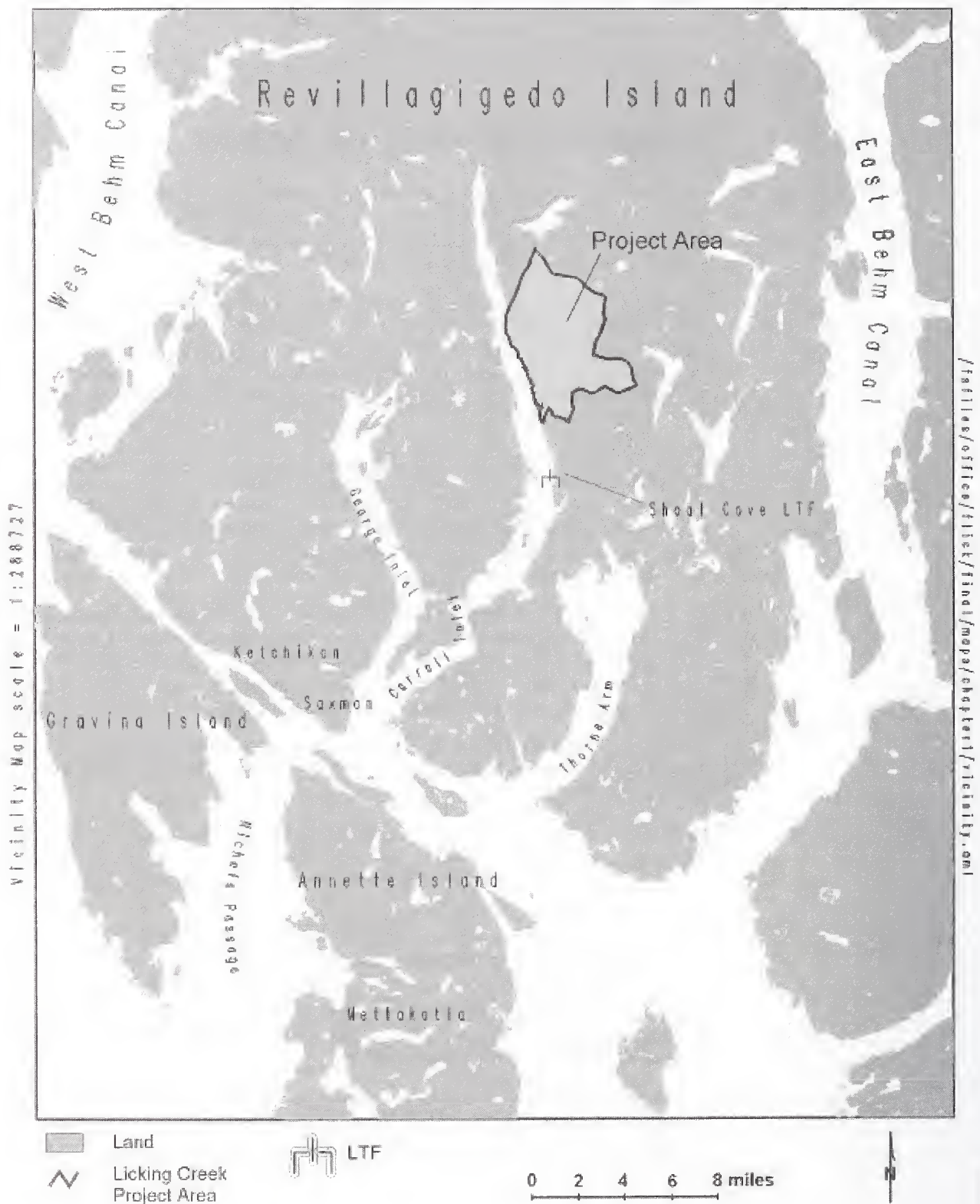
The Licking Creek project area is allocated to Timber Production (79 percent), Modified Landscape (19 percent), Old Growth Habitat (<1 percent), and Semi-Remote Recreation (<1 percent) LUDs.

- The desired condition for the **Timber Production LUD** is to manage lands for the production of sawtimber and other wood products. This is to help meet market demand for timber, and provide resource production opportunities and employment for local communities.
- The desired condition for the **Modified Landscape LUD** is to provide a sustained yield of timber and a mix of resource activities. Management activities dominate the background, and scenic quality is emphasized in the foreground.

Forest Plan Standards and Guidelines for other resources, such as wildlife habitat, scenery, heritage resources, soils, water quality and fisheries, are applied to minimize the adverse impacts of timber harvest on these resources.

Following Forest Plan Standards and Guidelines, no timber harvest or road construction is proposed within the **Old-growth Habitat** or the **Semi-Remote Recreation LUDs** under any alternative. No timber harvest or road construction is proposed within any Inventoried Roadless Areas.

Figure S-1  
Licking Creek Vicinity Map



Source: GIS, J. Llanos, 2001

## Issues and Concerns

Issues and concerns for the Licking Creek project were gathered through public and internal scoping. We identified four key issues, which are addressed through the design of the Proposed Action and alternatives. See "Effects of the Alternatives" in this chapter.

### **Issue 1: Timber Economics**

There is a concern about the economic viability of timber sales, and how the timber industry contributes to the overall economic health of the Ketchikan area and Southeast Alaska.

### **Issue 2: Wildlife Habitat**

There is a concern that the cumulative effects of past, present and proposed timber harvest may reduce habitat for deer and other wildlife. This may lead to reductions in deer and wolf populations, and may affect opportunities to hunt deer in the project area.

### **Issue 3: Watersheds and Fish Habitat**

There is a concern that the cumulative effects of past, present and proposed timber harvest may impact water quality and fish habitat in the project area.

### **Issue 4: Transportation**

There is a concern that the addition of new roads to our open road system may exceed our current and future capability for road maintenance.

## Other Concerns

Additional concerns were considered and determined not be key issues for this project. These were addressed through project design, mitigation, or application of Forest Plan Standards and Guidelines.

### **Karst**

A band of karst, with sensitive features such as caves and sinkholes, runs across the project area. Mitigation measures were included in all alternatives, and all proposed harvest units and access road segments were modified to exclude high-vulnerability karst.

### **Scenery**

The possibility of cumulative effects of past timber harvest and additional harvest not meeting Forest Plan Standards and Guidelines for Scenery was raised as an internal concern. Timber harvest units were modified during planning and alternative development to minimize impacts on scenery.

### **Subsistence**

For all subsistence resources, including deer, it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction on subsistence use in the project area.

All action alternatives incorporate and apply Forest Plan Standards and Guidelines for riparian areas, the beach and estuary fringe, and goshawk and marten habitats. No timber harvest would occur in riparian or beach and estuary fringe habitats in any alternative.

## Project Alternatives

The Proposed Action (Alternative 4) and four other alternatives were considered in detail in the Draft EIS. In the Final EIS, we consider an additional alternative, Alternative 6. Alternative 1 is the No-action Alternative; if we select this alternative, we would forego timber harvest in the project area at this time. The actions proposed for each alternative are displayed below. They represent different ways to satisfy the Purpose and Need and to respond to the issues and concerns that were identified by the public and internally.

Table S-1  
Harvest Objectives and Practices of the Alternatives

Category	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Silvicultural System (acres)</b>						
Even-aged	0	253	551	784	737	214
Uneven-aged	0	0	22	6	28	0
<b>Total Acres</b>	<b>0</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>214</b>
<b>Harvest Systems (CCF)</b>						
Cable	0	5,293	12,537	22,964	8,421	10,287
Shovel	0	303	711	4,392	642	831
Helicopter	0	5,113	10,584	6,200	23,198	0
<b>Harvest Volume <sup>1/</sup> [CCF (MMBF)] <sup>2/</sup></b>						
	0	10,709 (5.4)	23,832 (11.9)	33,556 (16.8)	32,261 (16.1)	11,118 (5.6)
<b>Roads (miles)</b>						
New construction--classified	0	0.67	1.06	3.13	0	0
New construction--temporary	0	0.83	1.11	2.36	0	0
<b>Total New Road Miles</b>	<b>0</b>	<b>1.50</b>	<b>2.17</b>	<b>5.49</b>	<b>0</b>	<b>0</b>
Reconstruction	0	4.11	4.11	1.65	4.11	0

<sup>1/</sup> Excluding right-of-way volume

<sup>2/</sup> MBF = 1,000 board feet; CCF = 100 cubic feet

Source: D. Fletcher, 2002

**Alternative 4 (the Proposed Action and Preferred Alternative)** was designed to emphasize timber economics. **Alternative 3** was designed to minimize adverse effects on critical winter habitat for deer. **Alternative 2** was designed to minimize adverse effects on wildlife habitat and watersheds, while providing for some timber harvest. **Alternative 5** was designed to harvest timber without building any new roads. **Alternative 6** was also designed to harvest timber without building any new roads, but does not utilize helicopter yarding.



## Effects of the Alternatives

The effects of the alternatives on the resource issues and concerns are summarized below. For a full understanding of the environmental effects, Chapter 3 of the Final EIS should also be read.

Table S-2  
Comparison of Alternatives by Issue

Issues	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Issue 1: Timber Economics</b>						
Harvest Volume CCF (MMBF)		10,709 (5.4)	23,832 (11.9)	33,556 (16.8)	32,261 (16.1)	11,118 (5.6)
Average harvest cost <sup>1/</sup> (\$/CCF)	0	169.52	153.94	130.64	162.78	89.76
Expected bid value \$ (parenthesis = deficit value)		(332,129)	(366,886)	278,578	(753,807)	566,037
Direct income generated (millions \$)	0	1.26	2.80	3.95	3.80	1.30
Direct job years created <sup>2/</sup>	0	28	63	89	85	29
<b>Issue 2: Wildlife Habitats <sup>3/</sup></b>						
Reduction in deer habitat capability from existing conditions	0	2%	4%	9%	5%	3%
Cumulative reduction in deer habitat capability since 1954 <sup>3/</sup>	33%	34%	36%	39%	36%	35%
Reduction in marten high-value habitat capability <sup>3/</sup> (from existing)	0	4%	11%	14%	15%	5%
Post-harvest open road density - VCU 7460	0.8	0.8	0.8	0.8	0.8	0.8
Post-harvest open road density - WAA 406	0.3	0.3	0.3	0.3	0.3	0.3
<b>Issue 3: Watersheds &amp; Fish Habitat</b>						
Class II stream crossings (reconstructed) <sup>4/</sup> (2 bridges, 1 culvert)	0	3	3	3	3	0
Class III stream crossings (new) <sup>4/</sup>	0	0	1	2	0	0
Class IV stream crossings (new) <sup>4/</sup>	0	0	0	2	0	0
<b>Issue 4: Transportation</b>						
Estimated cost of road construction and maintenance (\$)	0	532,150	632,850	1,078,900	326,000	140,000
Possible significant effects from roads on soils and water quality	No	No	No	No	No	No
<b>Other Concerns</b>						
Possibility of adverse effect on high-vulnerability karst	No	No	No	No	No	No
Number of proposed harvest units visible from viewpoints	0	2	5	9	9	4
Significant possibility of significant restriction on subsistence use	No	No	No	No	No	No

1/ For optional removal of utility logs.

2/ Based on 5.28 direct jobs per MMBF; job year/harvest ratio from Forest Plan

3/ Wildlife effects are reported for the project area, unless otherwise noted.

4/ All new and reconstructed stream crossings would meet standards to provide fish passage.

Source: K. O'Connor, 2002

### Issue 1: Timber Economics

Alternative 1 proposes no timber harvest, and thus offers no opportunity for timber-related employment or personal income. The action alternatives would result in timber-related employment opportunities in proportion to their total harvest volumes. Alternative 4 offers the most timber volume, generates the highest potential number of jobs, and has a positive expected bid value. Alternative 5 offers the second-highest timber volume and generates the

second-highest number of jobs, but has the most negative expected bid value at (\$753,807) of all the alternatives due to a high percentage of helicopter harvest. Alternative 2 offers the least timber volume, and generates the fewest jobs. Alternative 3 offers the third-highest timber volume and generates the third-highest number of jobs. These last two alternatives also have negative expected bid values of (\$332,129) for Alternative 2 and (\$366,886) for Alternative 3. Alternative 6 offers volume and generates jobs similar to Alternative 2, but is substantially more economically efficient than Alternative 2, with a positive expected bid value of \$566,037 and the lowest cost-per-CCF to harvest.

## **Issue 2: Wildlife Habitat**

Deer habitat capability is currently above the minimum recommended density to maintain wolf populations in the project area, and this condition would continue under all action alternatives. The numbers of deer would remain adequate to sustain wolf predation and expected hunting levels and subsistence use. The action alternatives would reduce the deer habitat capability within the project area, with the effect proportional to the proposed harvest. Alternative 4 would have the greatest effect, followed in decreasing order by Alternative 5, Alternative 3, Alternative 6, and Alternative 2 (Table 2-2). The proposed timber harvest, for all alternatives, would reduce current deer habitat capability within WAA 406 by only 1 percent. For all action alternatives, post-harvest open road densities would be within the recommended levels for wolves, but above the recommended maximum densities for marten. However, these open roads are not connected to any communities and motor vehicle traffic is light, and the road densities should not adversely affect marten. After harvest and silvicultural activities are completed, all new roads would be closed.

## **Issue 3: Watersheds and Fish Habitat**

Anadromous fish (salmon) habitat within the Licking Creek project area is minimal, and the project area watersheds are, generally, unproductive for these species. With the application of Forest Plan Standards and Guidelines, including those for riparian areas, risks to freshwater and marine resources and Essential Fish Habitat would be minimized. Recreational fishing access would be unaffected, as all new roads would be closed after timber harvest and associated silvicultural activities. Of the action alternatives, Alternative 4 would have the greatest potential effect on fish and water resources, followed by Alternative 5, Alternative 3, Alternative 2, and Alternative 6. No new stream crossings are proposed on Class I or II streams under any of the action alternatives. Three existing Class II crossings would be reconstructed (two bridges and one culvert) under Alternatives 2, 3, 4, and 5.

## **Issue 4: Transportation**

Forest Plan Standards and Guidelines and Best Management Practices (BMPs) would be applied to all road construction activities for all alternatives. New roads planned for Alternatives 2, 3, and 4 would be located to minimize crossing of karst features, wetlands, and slopes and soils at high risk for mass movement. Application of mitigation and BMP measures would minimize erosion of road surfaces, and new stream crossings would be designed to minimize sediment delivery to streams. In order to obtain an affordable road system with all roads properly maintained, the majority of roads (and all new roads) would be closed after completion of timber harvest and silvicultural activities. No new roads are planned for Alternative 5 or 6. No new roads or other harvest activities are proposed within any inventoried roadless areas.

## **Other Concerns**

### **Karst**

Substantial karst mineral deposits were found in the project area during field reconnaissance, including some highly vulnerable features such as caves and sinkholes. All timber harvest and road construction proposed for the action alternatives would meet Forest Plan Standards and Guidelines for management of karst resources, and avoid high-vulnerability karst and cave features. See also Chapter 3, Geology, Minerals, and Karst.

**Scenery**

Timber harvest units were designed during planning and alternative development to minimize impacts on scenery. Under Alternative 2, only two harvest units would be visible from viewpoints along Carroll Inlet. Portions of five harvest units would be visible under Alternative 3, nine harvest units under Alternatives 4 and 5, and four harvest units under Alternative 6. All timber harvest proposed for the action alternatives in this project, combined with the existing harvest, would meet the Visual Quality Objectives for the project area in all viewsheds.

However, after the harvest of one unit in the Madder Timber Sale, which is scheduled to be sold, the Calamity Creek and Marble Creek area viewshed would not quite meet Visual Quality Objectives from one viewpoint in Carroll Inlet. None of the Licking Creek alternatives would substantially add to the impacts created by the Madder Timber Sale unit. See also Chapter 3, Scenery.

**Subsistence**

The project area is not within a high-use subsistence area, and no significant concerns about subsistence resources and uses were identified during public scoping or consultation with tribal governments. Most deer hunting in the project area is by Ketchikan (non-rural) residents, and subsistence use is very light. The proposed timber harvest, for all alternatives, would reduce current deer habitat capability within WAA 406 by only 1 percent. Deer hunting demand, for both subsistence use and non-subsistence hunting, is expected to remain below 10 percent of the habitat capability, which is sustainable. For all subsistence resources, it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction in subsistence resources or uses in the project area. See also Chapter 3, Subsistence.





Skunk cabbage and muskeg; photo by Sheila Spores



# **Chapter 1**

## **Purpose and Need**



# Chapter 1

## Purpose and Need

### Introduction

This Final Environmental Impact Statement (EIS) was prepared by the Ketchikan-Misty Fiords Ranger District office of the Tongass National Forest to document our analysis of a proposed timber sale within the Licking Creek project area.

This Final EIS states the Purpose and Need for, and outlines the effects of, alternatives to the proposed Licking Creek Timber Sale. It describes Alternative 1 (“No Action”), Alternative 4 (“Proposed Action”), and four other alternatives for harvesting timber. The action alternatives include building and maintaining roads and maintaining a log transfer facility (LTF). No timber harvest or other activity is proposed within any roadless areas. This document discloses the direct, indirect, and cumulative environmental effects, and any irreversible or irretrievable commitment of resources that would result from the Proposed Action or alternatives.

This Final EIS was prepared according to the format established by the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1500-1508). In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental effects of the alternatives and how adverse effects may be mitigated.

**Chapter 1** explains the Purpose and Need for the Proposed Action and the public issues surrounding the action. This chapter discusses how the Licking Creek Timber Sale relates to the Tongass Land and Resource Management Plan (Forest Plan) and other legal and administrative obligations.

**Chapter 2** describes and compares the alternatives to the Proposed Action. This chapter summarizes the environmental effects, implementation, and mitigation that would occur with each of the alternatives.

**Chapter 3** describes the existing environment as it relates to issues associated with this project. It predicts the environmental effects likely to occur with implementation of the alternatives. These effects include both direct and indirect impacts of each alternative on the human and natural environments, as described for each resource issue. Chapter 3 also discloses the potential cumulative impacts of past, present, and reasonably foreseeable future actions.

**Chapter 4** contains the list of preparers, distribution list, glossary, literature cited, and an index. The glossary will be especially useful to reviewers unfamiliar with technical terms or some of the more relevant laws regarding the resource analyses.

**Appendices** provide supporting information on units, roads, and visual effects. Appendix A describes how the Licking Creek Timber Sale fits into the overall timber program for the Tongass National Forest. Additional documentation may be found in the project planning record located in the Ketchikan-Misty Fiords Ranger District office in Ketchikan, Alaska.

### Document Organization

## Purpose and Need

### Forest Plan Goals and Objectives

The Licking Creek Timber Sale is proposed to respond to goals and objectives of the Forest Plan, and to help move the project area towards desired future conditions described in that plan.

The Forest Plan identified the following goals and objectives:

- Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner (Forest Plan, page 2-4).
- Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the market demand for the planning cycle (Forest Plan, page 2-4).
- Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska (Forest Plan, page 2-3).
- Support a wide range of natural resource employment opportunities within Southeast Alaska's communities (Forest Plan, page 2-3).

## Proposed Action

The Forest Service defined a "Proposed Action" early in the planning process. This served as a starting point for the project Interdisciplinary Team (IDT), and gave the public and other agencies specific information on which to focus comments. The IDT then developed alternatives to the Proposed Action, to respond to environmental issues, public concerns, and comments from other agencies. This process is discussed in detail in Chapter 2. The Proposed Action may become, but does not necessarily have to be, the "preferred" or final "selected" alternative.

Alternative 4 corresponds to the Forest Service's initial Proposed Action. The original Proposed Action identified approximately 39,851 CCF (19.9 MMBF) to be harvested from 899 acres. The Proposed Action was later refined to approximately 33,556 CCF (16.8 MMBF) to be harvested from 790 acres. (See the Alternative 4 map and a complete description of Alternative 4 in Chapter 2.) Approximately 5.5 miles of new road would be constructed and 4.1 miles of existing road would be repaired. Logs would be transported to an existing log transfer facility at Shoal Cove.

## Decisions to Be Made

The Record of Decision (ROD) for the Forest Plan established that timber harvest is appropriate in the Licking Creek project area. Based on the environmental analysis in the Final EIS for the project, the Tongass Forest Supervisor will decide if, where and how to make timber available from the Licking Creek Timber Sale. This will include:

- The location, design, and scheduling of timber harvest, road construction, log transfer facilities, and silvicultural practices,
- Access management measures (road, trail, and area restrictions and closures associated with the timber sale project), and
- Mitigation measures and monitoring requirements.

## Project Area

The Licking Creek project area is northeast of the communities of Ketchikan, Saxman and Metlakatla in the southeast corner of Alaska. It is located on Revillagigedo (Revilla) Island, and occupies approximately 14,424 land acres on the eastern shore of Carroll Inlet. Currently, it is accessible only by water or air. National Forest System lands encompass the majority of the project area, with a small 103-acre private holding in the southern portion. Cape Fox Corporation holds industrial timberlands well outside of the project area, to the southwest across Carroll Inlet. The project area map (Figure 1-1) shows the location of the project area and other land ownerships in the area.

The project area is within Value Comparison Unit (VCU) 7460. VCUs are similar in size to large watersheds in Southeast Alaska and generally follow major watershed divides. VCU 7460 is delineated on the project area map (Figure 1-1).

The Licking Creek project area is also within Wildlife Analysis Area (WAA) 406. WAAs are Forest Service land divisions that correspond to the "Minor Harvest Areas" used by the Alaska Department of Fish and Game. This geographic area is used for the wildlife and subsistence analyses in Chapter 3, and is also displayed on the project area map.

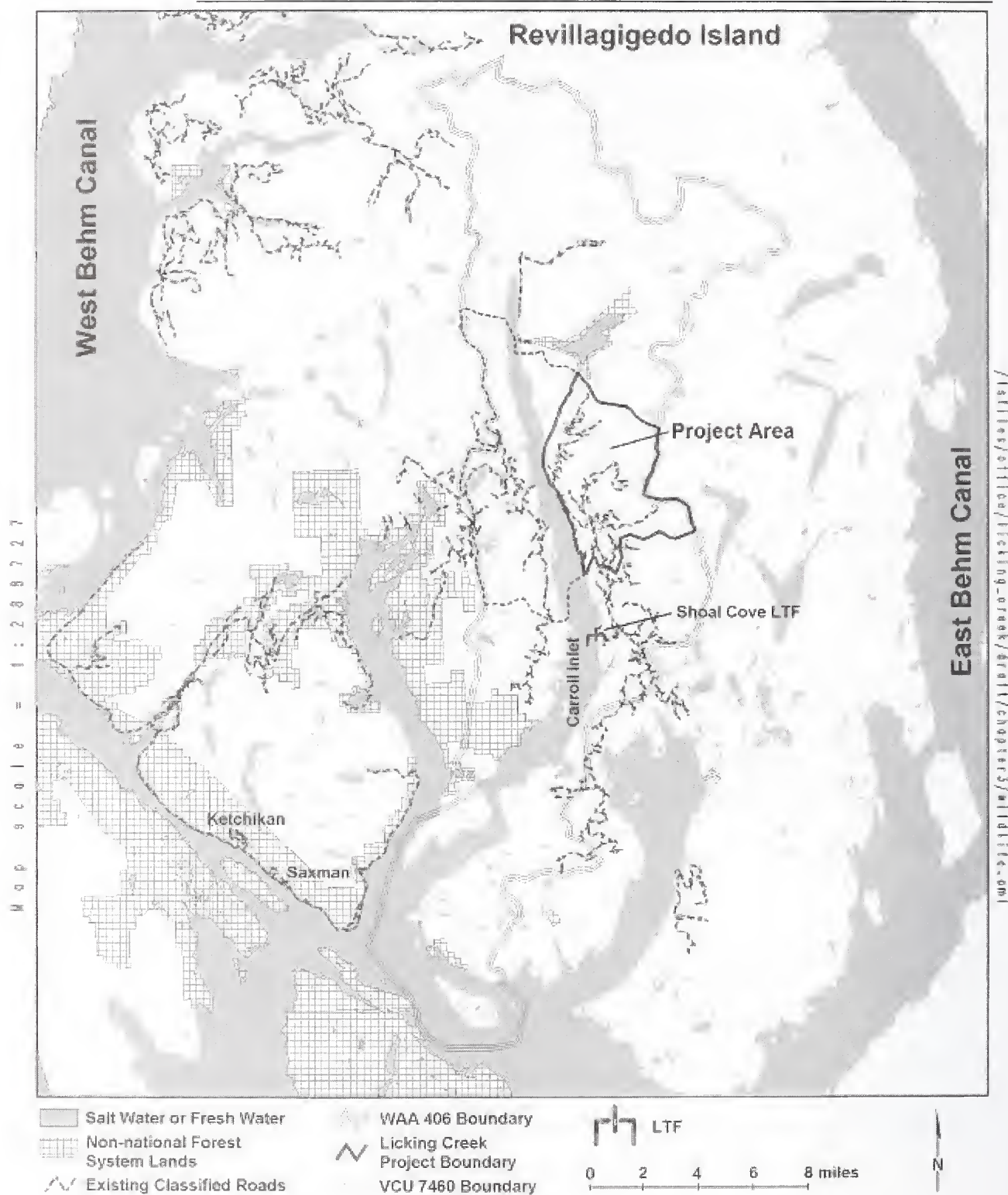
Past harvest and roadbuilding has occurred on the project area. Approximately 2,954 acres of timber has been commercially harvested on National Forest System lands, beginning in 1954 and continuing through 1996. The 103-acre parcel of private land in the project area was harvested in 1974. All 2,954 acres were clearcut harvested and are being managed as even-aged stands. Past management activities on the project area are discussed in more detail in Chapter 3.

Reasonably foreseeable actions are those that are currently planned or scheduled to occur. The *Tongass Ten Year Timber Sale Schedule* is the instrument through which future timber sales are scheduled. For the purposes of this analysis, reasonably foreseeable future actions are considered to be those that will occur within the next ten years. Seven units analyzed in the Sea Level Timber Sale EIS and one unit analyzed in the Mop Point/91 Knot Timber Sale EA occur in the project area. No other timber sales are planned to occur in WAA 406. These actions are discussed in more detail in the Introduction to Chapter 3, and under Cumulative Effects in each resource section of Chapter 3.



# 1 Purpose and Need

Figure 1-1  
Project Area Map Including VCU 7460 and WAA 406



Source: J. Llanos, GIS, 2002

## Relationship to the Tongass Land and Resource Management Plan

Forest planning takes place at national, regional, forest, and project levels. The Forest Plan is a forest-level analysis. It embodies the provisions of the National Forest Management Act and its implementing regulations, and other guiding documents, and sets forth in detail the direction for managing the land and resources of the Tongass National Forest. The Forest Plan was developed through extensive analysis, which is described in the Forest Plan Final EIS and the 1997 Record of Decision.

The Licking Creek Timber Sale Final EIS is a project-level analysis; its scope is confined to addressing the significant issues and possible environmental consequences of the project. It does not attempt to address decisions made at higher levels. It does, however, implement direction provided at those higher levels. Where appropriate, the Licking Creek Timber Sale Final EIS tiers to the Forest Plan EIS, as encouraged by 40 CFR 1502.20.

### Relationship to the Final SEIS for Wilderness Recommendations

In *Sierra Club v. Lyons* (J00-0009CV(JKS)), the U.S. District Court, District of Alaska directed the Forest Service to prepare a supplemental environmental impact statement (SEIS) that evaluates and considers roadless areas within the Tongass for recommendation as potential wilderness areas. The Notice of Availability for the Final SEIS and Record of Decision appeared in the Federal Register on March 7, 2003.

The roadless inventory that was prepared for the 1997 Forest Plan was updated to support the SEIS (Final SEIS Alternative 1 Maps). The Licking Creek project does not propose any timber harvest or road construction in any Inventoried Roadless Area.

### Forest Plan Land Use Designations

The Forest Plan uses land use designations (LUDs) to guide management of the National Forest System lands within the Tongass. Each LUD provides for a unique combination of activities, practices and uses. Goals, objectives, and desired future conditions for each LUD that occurs within the Licking Creek project area are included or summarized below, and the LUD locations are shown in the Alternative 1 Land Use Designations map at the end of Chapter 2. Chapter 3 of the Forest Plan contains a detailed description of each land use designation.

#### Timber Production

Approximately 79 percent of the lands in the Licking Creek project area have a land use designation (LUD) of Timber Production. Most of the proposed harvest units and road construction are within this LUD. The goals of this designation are to:

- maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs,
- manage these lands for sustained long-term timber yields, and
- seek to provide a supply of timber from the Tongass National Forest which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this land use designation.

For Timber Production, the desired future condition includes a sustained yield of timber, healthy tree stands in a balanced mix of age classes from young stands to trees of harvestable age, and a road system providing access for timber management as well as recreation, hunting and fishing, and other public uses. Recreation opportunities associated with roaded settings are available. The desired future condition is that some suitable and available timber stands will be in the early and middle successional stages.

#### Modified Landscape

Approximately 19 percent of the project area is within the Modified Landscape LUD. The goals of this land use designation are to:

# 1 Purpose and Need

- maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs,
- seek to provide a supply of timber from the Tongass National Forest which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this land use designation,
- provide a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments in the foreground distance zone, and
- recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and modify timber harvest accordingly.

For Modified Landscape, the desired future condition accepts a somewhat modified landscape, and emphasizes scenic quality in foreground distance zones. Recreation opportunities associated with natural-appearing to modified settings are available. A variety of successional stages provide a range of wildlife habitat conditions. A yield of timber is produced which contributes to Forest-wide sustained yield.

## **Old-growth Reserve**

Less than 1 percent of the project area is designated as Old-growth Reserve. Road construction and timber harvest are generally not allowed within this LUD, and none is proposed under any alternative.

The goals of this designation are to:

- maintain areas of old-growth forests and their associated natural ecological processes to provide habitat for old-growth associated resources, and
- manage early seral conifer stands to achieve old-growth forest characteristic structure and composition based upon site capability.

For Old-growth Reserve, the desired future condition is that all forested areas attain old-growth forest characteristics and provide a diversity of old-growth habitat types, associated species, and ecological processes. Old-growth Reserves are discussed further in the Biodiversity section in Chapter 3.

## **Semi-Remote Recreation**

Less than 1 percent of the project area is designated as Semi-Remote Recreation. No road construction or timber harvest is proposed under any alternative within this LUD.

The goals of this designation are to:

- provide predominantly natural or natural-appearing settings for semi-primitive types of recreation and tourism and for occasional enclaves of concentrated recreation and tourism facilities, and
- provide opportunities for a moderate degree of independence, closeness to nature, and self-reliance in environments requiring challenging motorized or non-motorized forms of transportation.

The desired future condition in the Semi-Remote Recreation LUD is to maintain a generally unmodified natural environment, with minimal human uses and activities.

Table 1-1 shows the acreages and percentages within the project area of each land use designation and of lands in other ownership. The Land Use Designation map for Alternative 1, at the end of Chapter 2, displays the location of these land allocations within the project area.



Table 1-1  
Project Area Current Land Use Designations and non-National Forest Acreages

Land Use Designation	Acres	Percent of Project Area
Timber Production	11,389	79%
Modified Landscape	2,779	19%
Old-growth Reserve	112	< 1%
Semi-Remote Recreation	41	< 1%
Other Ownership	103	< 1%
<b>Total Land Area Acres</b>	<b>14,424</b>	<b>100%</b>

Source: James Llanos, GIS, 2001

## Key Forest-wide Standards and Guidelines in Project Area

The following standards and guidelines delineate areas not available for programmed timber harvest within the Timber Production LUD. Each applies to a specific habitat or ecological component. More detailed information about these and other standards and guidelines can be found in the Forest Plan, Chapter 4.

### Beach and Estuary Fringe

The beach and estuary fringe is an area of approximately 1,000 feet inland from mean high tide along all marine coastlines. Programmed timber harvest is not allowed and roads are located outside of the fringe when possible.

### Karst and Caves

Surveys were conducted to search for karst and caves. Important karst and cave resources were found within the project area, and mitigation measures were included in all alternatives. All proposed harvest units and access road segments were modified to exclude high-vulnerability karst. Potential effects and mitigations for karst are discussed in the Geology resource section in Chapter 3 and in the Unit and Road Cards, Appendix B of the Draft EIS.

### Riparian

Riparian Management Areas are areas of special concern regarding fish, other aquatic resources, and wildlife. These areas are delineated according to the process-group direction in the Riparian Forest-wide Standards and Guidelines. All riparian area boundaries follow the Forest-wide Standards and Guidelines, and no timber harvest is proposed within Riparian Management Areas.

## Public Involvement

### Scoping

The Council on Environmental Quality (CEQ) defines scoping as "...an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 CFR 1501.7). The scoping process is used to invite public participation, to help identify public issues, and to obtain public comment at various stages of the EIS process. Although scoping is to begin early, it is really a process that continues until a decision is made. In addition to the following specific activities, the Licking Creek Timber Sale has been listed on the Tongass National Forest Schedule of Proposed Actions and included in the Tongass National Forest 10-Year Timber Sale Action Plan since 2000.

#### Notice of Intent (NOI)

A Notice of Intent was published in the Federal Register on July 6, 2001, when it was decided that an EIS was to be undertaken for the project.

#### Public Mailings

On November 16, 2000, a scoping letter was mailed to 385 individuals and groups that had previously shown interest in Forest Service projects in Southeast Alaska. This included Federal and State agencies, Alaska Native groups, municipal offices, businesses, interest groups, and individuals. Eleven responses to this initial mailing were received. On June 4, 2001, a second letter that displayed the significant issues and alternatives was mailed to 360 individuals and groups. An additional 11 responses were received to this mailing. These responses were used to help identify issues associated with the Proposed Action (see Issues, in the next section). The project was also briefly mentioned in general newspaper articles concerning the Ketchikan-Misty Fiord Ranger District's activities.

#### Public Meetings / Local News Media

In January 2002, the Forest Service began inviting public participation in monthly project meetings, in which IDT members discuss the current status of all planning projects, including Licking Creek. Display ads for these monthly meetings were published in the *Ketchikan Daily News*.

#### Consultations with Tribal Governments

Government-to-government consultations with federally recognized tribal governments and meetings with traditional tribal governments have taken place as follows:

- Ketchikan Indian Corporation (KIC) – July 20, 2001
- Organized Village of Saxman – August 13, 2001
- Metlakatla Indian Community (MIC) – November 1, 2001
- Organized Village of Saxman – November 20, 2001
- Metlakatla Indian Community (MIC) – November 27, 2002 (telephone conversation)
- Ketchikan Indian Corporation (KIC) – December 9, 2002
- Organized Village of Saxman – December 17, 2002
- Traditional tribal representatives for Tongass Tribe and Saxman

Tribal concerns were considered in the environmental analysis of effects of the alternatives. However, consultation with tribal governments does not imply that they endorsed the proposed action or any of the alternatives.

#### Consultations with Agencies, Communities and Other Groups

Letters were received from the Alaska Dept. of Fish and Game (September 25, 2001) and U.S. Fish and Wildlife Service (September 17, 2001) that concurred with the existing location of the

small Old-growth Reserves in VCU 7460, as they were designated for the Sea Level Timber Sale. The Sea Level project area encompassed the Licking Creek Timber Sale project area.

The Alaska Coastal Management Plan (ACMP) consistency review process was initiated upon publication of the Draft EIS through the Alaska Department of Natural Resources, Office of Project Management and Permitting (formerly the State of Alaska, Division of Governmental Coordination). A Project Clarification letter was submitted after analyzing responses to comments on the Draft EIS. The State has concurred with our determination.

A Biological Assessment was prepared and sent to the U.S. Fish and Wildlife Service as part of the Section 7 consultation process under the Endangered Species Act. An Essential Fish Habitat determination was provided to National Marine Fisheries Service. The National Marine Fisheries Service concurred with our findings. The U.S. Department of Interior (for the U.S. Fish and Wildlife Service) reported that the project area does not provide valuable habitat and had no comments on the Draft EIS.

The State Historic Preservation Officer has been consulted, in accordance with Section 106 of the NHPA and 36 CFR Part 800, and concurred that no National Register eligible sites would be affected by the proposed activities. No effects on known significant cultural resources are anticipated.

## Draft EIS

### Availability of Draft EIS for Public Comment

Availability of the Draft EIS was announced on December 6, 2002, both in the *Federal Register* and through legal notices published December 9, 2002 in the *Juneau Empire* (the newspaper of record) and the *Ketchikan Daily News*. These notices started a public comment period, which began December 6, 2002. The 45-day comment period ended January 21, 2003. The Draft EIS document was also mailed to Federal and State agencies, Native and municipal offices, and others who requested them.

### Public Meeting

After the Draft EIS was published, a public information meeting/open house was held in Ketchikan on January 7, 2003 to gather additional comments on the project. Two members of the public attended that meeting; written comments received are included in Appendix B, Response to Comments of this Final EIS.

### Subsistence Hearing

Following publication of the Draft EIS, a subsistence hearing was held in Saxman on January 8, 2003. Two individuals testified at the hearing. Testimony from that hearing is included as Appendix C of this Final EIS.

### Analysis and Incorporation of Public Comments to the Draft EIS

Twelve agencies, organizations, and individuals submitted written comments on the Licking Creek Draft EIS. Concerns raised in public comments to the Draft EIS reflected issues already considered by the IDT, but recommended additional suggestions for mitigation measures and alternatives. Comments included concern with the impact that cumulative levels of harvest could have on watersheds, concern that timber sales be economical to harvest, concerns for soils protection, and concerns for wildlife habitat protection. Chapter 2 contains a discussion of how the IDT incorporated public comment into the Final EIS. For a detail of public comment and the Forest Service response, see Appendix B of the Final EIS.

## Final EIS

### Publication of the Final Environmental Impact Statement

The Notice of Availability of this Final EIS has been published in the *Federal Register* and through legal notices in the *Juneau Empire*, the newspaper of record and in the *Ketchikan Daily News*. The publication of the legal notice in the newspaper of record initiates a 45-day appeal period. Copies of the Final EIS have been mailed to Federal and State agencies, federally recognized tribal governments, municipal offices, and to those who requested them or responded to the Draft EIS. The Final EIS is also available at the Ketchikan-Misty Fiords Ranger District Office.

## Issues

### Key Issues

Issues for the Licking Creek Timber Sale were identified through public and internal scoping. The project Interdisciplinary Team (IDT) analyzed all comments submitted, and considered the human dimension as well as the biological and physical environment. Similar concerns were combined into one issue statement where appropriate. The following four issues were determined to be key and within the scope of the project decision. The IDT developed alternatives to the proposed action to respond to these issues.

#### Issue 1: Timber Economics

There is a concern about the economic viability of timber sales, and how the timber industry contributes to the overall economic health of the Ketchikan area and Southeast Alaska. This issue includes several comments, such as:

- Timber volume: Maximize volume; meet the Allowable Sale Quantity; show a good profit; limit use of helicopter harvest; maximize clearcuts to maximize profits.
- Community economic health: Ketchikan's economy needs more timber sales; keep a timber sale program going; keep timber available; offer both small and medium sales from the project area.

#### Issue 2: Wildlife Habitat

The cumulative effects of past, present and proposed timber harvest may reduce habitat for deer and other wildlife. This may lead to reductions in deer and wolf populations, and may affect opportunities to hunt deer in the project area. Public comments included:

- Vary silvicultural prescriptions to enhance deer habitat.
- Display effects of roads on wildlife habitat and management indicator species.

#### Issue 3: Watersheds and Fish Habitat

The cumulative effects of past, present and proposed timber harvest may impact downstream water quality and fish habitat in the project area. This issue includes several comments, such as:

- Design roads to minimize runoff.
- Display effects of roads on Class I (anadromous) fish habitat.
- Analyze sediment for fish habitat.
- Study stream temperature.
- Consider cumulative effects.
- Discuss and display high hazard soils and steep slopes.
- Restore fish passage at stream crossings.
- Include mitigation to reduce windthrow in riparian buffers.
- Standards and Guidelines are adequate to protect from road erosion.

#### Issue 4: Transportation

An open road system should be managed to meet our current and future capability for road maintenance. In order to obtain an affordable road system with all roads properly maintained, the majority of roads (and all new roads) would be closed after completion of timber harvest and silvicultural activities. Several concerns were expressed about road management:

- Build roads and keep open to facilitate future harvest opportunities.
- Maximize roads to facilitate conventional yarding and reduce logging costs.
- Close roads after harvest.
- Remove roads, rather than blocking to close them, after harvest.



## Other Concerns

- Road building and maintenance is costly - do not build any new roads.

Other comments received during public scoping, and concerns raised internally, were also considered but not identified as key issues for this project. These concerns were either addressed through mitigation, would not be affected by any of the action alternatives, or were already regulated by Forest Plan Standards and Guidelines. Many of these are discussed in Chapter 2 under "Items Common to All Action Alternatives." The following concerns were considered in development of the action alternatives.

### Karst

A band of karst, with sensitive features such as caves and sinkholes, runs across the project area. Timber harvest and road building could impact these resources. Mitigation measures were included in all alternatives, and all proposed harvest units and access road segments were modified to exclude high-vulnerability karst.

### Scenery

The possibility of cumulative effects of past timber harvest and additional harvest not meeting Forest Plan Standards and Guidelines for Scenery was raised as an internal concern. Public comments included:

- The project area can be logged, it is not visible from Ketchikan and very few people will see this area.
- No need to exceed (improve upon) the Forest Plan Standards and Guidelines for Scenery; this is not a high tourist area.

Timber harvest units were modified during planning and alternative development to minimize impacts on scenery.

### Subsistence

The possibility of reductions in wildlife habitat, which may result in a significant possibility of a significant restriction on subsistence use, was raised internally as a concern. However, the project area is not within a high-use subsistence area, and no significant concerns about subsistence resources and use were identified during public scoping or consultation with tribal governments. For all subsistence resources, including deer, it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction on subsistence use in the project area.

### Other Comments

- Band-tailed pigeons were observed in the project area during field surveys in 2001. During consultation with Alaska Dept. of Fish and Game, this species was identified as a species of special interest because Southeast Alaska is the northern periphery of its range.
- Comments expressed concern about timber harvest on steep slopes (greater than 72 percent), and suggested that this harvest be limited to small areas.



## Federal and State Permits, Licenses, and Certifications

To proceed with timber harvest as addressed in this Final EIS, various permits must be obtained from Federal and State agencies. The following permits have been obtained for the existing log transfer facility (LTF) at Shoal Cove. No other permitting requirements have been identified for the proposed project.

### **State of Alaska, Department of Natural Resources**

Use of the existing Shoal Cove log transfer facility (LTF) requires authorization for occupancy and use of tidelands and submerged lands from the Alaska Department of Natural Resources. These authorizations have been obtained.

### **State of Alaska, Department of Environmental Conservation**

DEC participates in cooperative water quality management through Section 319 of the Clean Water Act and a Memorandum of Agreement with the Forest Service. They also issue a certification of compliance with Alaska Water Quality Standards under Section 401 of the Clean Water Act. A certification of compliance has been obtained for the Shoal Cove LTF.

### **U.S. Army Corps of Engineers**

Section 404 of the Clean Water Act (1977, as amended) requires a permit from the Corps of Engineers before filling or dredging in wetlands and tidelands. A permit has been obtained for the Shoal Cove LTF.

Road construction would be done in accordance with Best Management Practices listed in 33 CFR 323.4 (a) (6). Under an exemption, no 404 permits are needed for road construction and timber harvest that are conducted for silvicultural purposes. The Shoal Cove road system is not connected to any community, and all new roads will be closed after timber harvest.

### **U.S. Environmental Protection Agency**

A Storm Water Discharge Permit and a National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act) have been obtained for the Shoal Cove LTF.

## Applicable Laws and Executive Orders

Shown below is a partial list of Federal laws and Executive Orders pertaining to project-specific planning and environmental analysis on Federal lands. While most pertain to all Federal lands, some of the laws are specific to Alaska. Disclosures and findings required by these laws and orders are contained in Chapter 2 of the Draft EIS.

- Alaska Native Claims Settlement Act (ANCSA) of 1971
- Alaska National Interest Lands Conservation Act (ANILCA) of 1980
- American Indian Religious Freedom Act of 1978
- Archeological Resource Protection Act of 1980
- Cave Resource Protection Act of 1988
- Clean Air Act of 1970 (as amended)
- Clean Water Act of 1977 (as amended)
- Coastal Zone Management Act (CZMA) of 1972 (as amended)
- Coastal Zone Management Act MOU of 1999
- Endangered Species Act (ESA) of 1973 (as amended)
- Executive Order 11593 (cultural resources)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)
- Executive Order 13007 (Indian sacred sites)
- Executive Order 13175 (government-to-government consultation)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)
- Magnuson-Stevens Fishery Conservation and Management Act of 1996
- Marine Mammal Protection Act of 1972
- Multiple-Use Sustained-Yield Act of 1960
- Migratory Bird Treaty Act of 1918 (amended 1936 and 1972)
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- National Historic Preservation Act of 1966 (as amended)
- Organic Act of 1897
- Rivers and Harbors Act of 1899
- Tongass Timber Reform Act (TTRA) of 1990
- Wild and Scenic Rivers Act of 1968, amended 1986

# 1 Purpose and Need

## **State of Alaska**

The Coastal Zone Management Act (CZMA) of 1972, as amended, pertains to the preparation of an EIS. Federal lands are not included in the definition of the coastal zone as prescribed in the CZMA. However, the Act requires that when Federal agencies conduct activities or developments that affect the coastal zone, the activities be consistent to the maximum extent practicable with the enforceable policies of the Alaska Coastal Management Program (ACMP). Such "consistency determinations" are made by the Forest Service, and are reviewed by the State of Alaska as required by the CZMA.

The Alaska Coastal Management Program incorporated the Standards and Guidelines of the Alaska Forest Resources and Practices Act (AFRPA) of 1979 for timber harvesting and processing. The Forest Plan Standards and Guidelines and mitigation measures described in Chapters 2 and 3 of this document meet or exceed the State standards. The AFRPA Findings regarding consistency are included in Chapter 2.

## **Availability of Planning Record**

An important consideration in preparation of this EIS has been reduction of paperwork as specified in 40 CFR 1500.4. In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated. The planning record contains material that documents the NEPA process and analysis from the beginning of the project to the publication of the Final EIS.

The planning record is located at the Ketchikan–Misty Fiords Ranger District office in Ketchikan, Alaska. The planning record includes all project information, including detailed resource reports and the results of public involvement efforts. The planning record is located at the Ketchikan-Misty Fiords Ranger District Office in Ketchikan, Alaska, and is available for review during regular business hours. Information from the record is available upon request.

Other reference documents, such as the Tongass Land and Resource Management Plan (Forest Plan) and the Tongass Timber Reform Act, are available at public libraries throughout. The Forest Plan is also available on the Internet (<http://www.fs.fed.us/r10/tongass/>) and CD-ROM.

# **Chapter 2**

## **Alternatives**





# Chapter 2

## Alternatives

### Introduction

This chapter describes and compares the alternatives for the Licking Creek Timber Sale project. It includes a discussion of how alternatives were developed, an overview of mitigation measures, monitoring and other features common to all alternatives, a description and map of each alternative considered in detail, and a comparison of these alternatives focusing on the significant issues. Alternative 4 is the Preferred Alternative. Chapter 2 is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14).

The information used to compare alternatives at the end of this chapter is summarized from Chapter 3, "Affected Environment and Environmental Consequences." Chapter 3 contains the detailed scientific basis for establishing baselines and measuring the potential environmental consequences of each of the alternatives.

### Changes Between Draft and Final

In the Draft EIS, the Forest Service identified Alternative 4 as the Preferred Alternative. Alternative 4 proposed harvesting approximately 33,556 CCF (16.8 million board feet) (MMBF) of timber from approximately 790 acres of National Forest System land, would build 5.5 miles of new road, and would utilize an existing log transfer facility at Shoal Cove. All new classified roads would be closed after harvest activities were complete.

#### **Public Comments on Draft EIS/Development of Additional Alternative**

The issues raised during the Response to Comments were previously identified by the IDT during public scoping. The alternatives presented in the Draft EIS were developed to respond to these issues. Some public comments on the Draft EIS suggested that the IDT consider additional alternatives, such as a maximum timber harvest alternative, and an alternative that builds no new roads, does not utilize helicopter yarding, and includes more partial harvest. A maximum timber harvest alternative had already been considered by the IDT but eliminated from detailed consideration.

In response to public comments, a new alternative, Alternative 6, was designed with no helicopter yarding and no new road construction. Although partial harvest was recommended in the public comments, partial harvest is almost exclusively done with helicopter-yarding methods in Southeast Alaska; therefore, the silvicultural systems were maintained as primarily even aged. Units and portions of units requiring either road construction or helicopter yarding to access were dropped. This new alternative is analyzed in detail, with the other project alternatives, in Chapter 3 of this Final EIS.

## Roadless Area Conservation Rule and Transportation Policy

The Roadless Area Conservation Final Rule (Roadless Rule, 36 CFR 294.10, 01/12/01) established prohibitions on road construction, road reconstruction, and timber harvest in inventoried roadless areas on National Forest System lands. The inventoried roadless areas to which these prohibitions apply are identified in a set of maps contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000. (For the Tongass National Forest, these maps correspond closely with the roadless area inventory done for the 1997 Forest Plan.) The Licking Creek project does not propose any timber harvest or road construction within any roadless area as mapped for the Roadless Rule.

## Forest Plan Supplemental EIS

In *Sierra Club v. Lyons* (J00-0009CV(JKS)), the U.S. District Court, District of Alaska directed the Forest Service to prepare a supplemental environmental impact statement (SEIS) that evaluates and considers roadless areas within the Tongass for recommendation as potential wilderness areas. The Notice of Availability for the Final SEIS and Record of Decision appeared in the Federal Register on March 7, 2003.

The roadless inventory that was prepared for the 1997 Forest Plan was updated to support the Final Supplemental EIS (Final Supplemental EIS Alternative 1 Maps). The Licking Creek project does not propose any timber harvest or road construction in any Inventoried Roadless Area.

## Development of Alternatives

This chapter describes the Proposed Action, four other action alternatives and a No-action Alternative. These alternatives were developed to address the Purpose and Need for the project, to meet Forest Plan Standards and Guidelines and applicable laws, and to respond to the significant issues that were identified during our public involvement process.

During the early planning phase of this project, a logging system and transportation analysis was completed for the project area. Based on this analysis, the suitable timber in the project area was divided into potential harvest areas, or units. This group of units is called the unit pool and is described in the Silviculture and Timber Resources section in Chapter 3. We made use of topographic maps and aerial photos, a large quantity of resource data available in geographic information system (GIS) format, and field verification to identify and design the units.

Potential harvest units were validated, modified, dropped and/or deferred based on findings of the interdisciplinary team (IDT). Some units were dropped from the original unit pool to address watershed concerns (see discussion under Issue 3: Watersheds and Fish Habitat in Chapter 3). Modifications were made as needed to meet Forest Plan Standards and Guidelines. For instance, if a previously unknown stream was discovered, the Riparian Standards and Guidelines were applied. Some units were adjusted to have more logical boundaries or to facilitate logging systems. This effort led to the current unit pool, from which the action alternatives were developed. Site-specific descriptions and resource considerations for each potential harvest unit are included in Appendix B, Unit Cards, of the Draft EIS. Proposed access methods are also described in Appendix B, Road Cards, of the Draft EIS.

Each alternative provides a different response to the significant issues for the Licking Creek project, and was developed through an intensive IDT evaluation. The IDT used information from the analysis of scoping comments, in conjunction with the field-verified pool of units for the project area, to formulate different alternative approaches. Preliminary analysis and management direction were used to further refine the alternatives. Comments to the Draft EIS were analyzed and a new alternative (Alternative 6) was included in the Final EIS.

The action alternatives presented in this document provide a range of options to achieve the purpose of the project. Within this range, various combinations of alternatives can be considered in determining the selected alternative.

## Items Common to All Alternatives

All alternatives including the Proposed Action are consistent with the Forest Plan. All applicable Forest-wide and Land Use Designation Standards and Guidelines have been incorporated. The Forest Service uses many mitigation and preventive measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project. Additional direction comes from applicable Forest Service manuals and handbooks.

The following items are listed to highlight some of the key direction from the Forest Plan (primarily from Chapter 4, "Forest-wide Standards and Guidelines"). See also the next section, Mitigation, and the unit cards and road cards in Appendix B of the Draft EIS.

### Standards and Guidelines

#### Biodiversity and Old Growth

Each alternative complies with the Forest Plan conservation biology strategy designed to ensure well-distributed viable populations of wildlife.

One medium and one small Old-growth Habitat Reserve (OGR) occur within VCU 7460. The medium OGR is outside of the project area, and is located on the west side of Carroll Inlet.

The small Old-growth Habitat Reserves (Old-growth Reserve land use designation) mapped in the Forest Plan Final EIS have been evaluated through an interagency process for size, spacing, and habitat composition. The small Old-growth Habitat Reserves, as designated in the Sea Level EIS, were approved by an interagency team of biologists for the Licking Creek project area. A portion of one small OGR occurs at the upper edge of the project area.

#### Fish and Marine Habitats

Forest Plan Standards and Guidelines for riparian areas would be applied to all fish streams within the project area, and to non-fish-bearing Class III streams.

The watershed resource report for the project included watershed and site-level considerations. No adjustments to Riparian Management Area (RMA) boundaries were identified, and all proposed RMAs follow the Forest Plan Standards and Guidelines. Unit cards and road cards (Appendix B of the Draft EIS) show which streams are likely to need special attention during implementation, such as applying timing restrictions for in-stream activities, or using larger-than-normal culverts or bridges.

No new log transfer facilities (LTFs) are proposed. Monitoring surveys, as required by State of Alaska permits, have been conducted and effects on marine resources were within permitted levels.

#### Karst Resources

All activities have been designed to avoid high-vulnerability karst, and to meet Forest Plan Standards and Guidelines for low- and moderate-vulnerability karst areas.

#### Heritage Resources

Areas considered as having a high probability of containing heritage resources (cultural sites) have been surveyed by heritage resource specialists. All identified cultural sites were avoided in the project design for all alternatives. We obtained concurrence from the Alaska State Historic Preservation Officer and other interested parties that sites eligible for the National Register of Historic Places would not be affected by actions of any of the alternatives.



## Recreation

Recreation resources provide opportunities on National Forest System lands in concert with, and supplemental to, those opportunities which are located on other land ownerships and jurisdictions. The following Forest Plan guidance is applicable to recreation areas, sites, and facilities in the Licking Creek project area:

- complement commercial public services (i.e., resorts, marinas, stores, service stations) within communities or on private or other public land.
- support a system of anchorages suitable for recreation boats along small boat waterways, which connect communities or provide access to popular recreation attractions, and
- provide other appropriate facilities to meet specific identified recreation needs on a case-by-case basis.

## Scenery

No lands within the project area are within the Scenic Viewshed LUD. Proposed timber harvest units have been designed to meet the visual quality objectives of the Timber Production and Modified Landscape LUDs.

## Soils, Water Quality and Wetlands

Potential harvest units with slopes greater than 72 percent have received an on-site analysis of slope, and an assessment of potential downstream effects. Only areas with relatively low levels of risk are included in the unit pool.

Road locations avoid slopes greater than 67 percent, unstable areas, and slide-prone areas where it is feasible to do so. All roads will be located and designed to avoid or minimize effects on wetlands.

## Subsistence

All alternatives have been evaluated for their potential impact to subsistence resources, in compliance with ANILCA, Title VIII, Section 810. None of the alternatives would result in a significant possibility of a significant restriction on subsistence resources or uses in WAA 406 or the Licking Creek project area, and the project area is not within a high-use subsistence area. Because the Forest Plan analysis (Forest Plan, Final EIS, p. 3-224 to 3-229 and ROD, p. 36) showed that implementation of the Forest Plan may result in a significant restriction to subsistence use of deer due to the potential effects of projects on the abundance and distribution of these resources, and on competition for these resources, across the entire Tongass National Forest, a subsistence hearing was held on January 8, 2003, during the public comment period for the Draft EIS (see Appendix C, Subsistence Hearing). No concerns with subsistence resources in this area were expressed at this hearing.

## Threatened, Endangered and Sensitive Species

Biological assessments have been completed for threatened or endangered species potentially inhabiting the project area. Standards and guidelines have been applied as needed to ensure that any listed species or its associated habitat would not be adversely affected. The National Marine Fisheries Service has concurred that the actions described within the proposed project are not likely to adversely affect any aquatic threatened or endangered species. Consultation was initiated with the U.S. Fish and Wildlife Service, and no terrestrial threatened or endangered species are known to occur in the Licking Creek Timber Sale project area. The U.S. Department of Interior (for the U.S. Fish and Wildlife Service) reported that the project area does not provide valuable habitat and had no comments on the Draft EIS. Adverse effects to listed species are not expected from implementation of any of the action alternatives.

Biological evaluations for all sensitive species potentially inhabiting the project area have been completed. The Forest Plan contains standards and guidelines for each designated sensitive species, and these are incorporated into the project as applicable. Forest Plan Standards and Guidelines would be applied to minimize any potential adverse effects on sensitive species.

## Wildlife Habitats

The Forest Plan conservation biology strategy, including all species-specific standards and guidelines, is considered sufficient to maintain habitat for viable populations of all species potentially within the Tongass National Forest, including small endemic terrestrial mammals.

The Licking Creek Timber Sale is part of the Revillagigedo Island/Cleveland Peninsula biogeographic province, which is considered a high-risk province for American marten habitat. In such areas, timber harvest units that contain high-value marten habitat (productive old-growth (POG) forest less than 1,500 feet in elevation) must meet specific Forest Plan Standards and Guidelines. Because less than 33 percent of the original POG forest has been harvested in VCU 7460, standards and guidelines include retaining: 1) 10-20 percent of the original stand structure, 2) an average of at least four large trees (20-30 inch DBH or greater) per acre for future snag recruitment, 3) an average of at least three large decadent trees per acre, and 4) an average of at least three pieces per acre of down material (logs 20-30 inches or greater in diameter and 10 feet long), generally distributed throughout the harvest unit. Retained trees should have a reasonable assurance of windfirmness and should be uniformly distributed throughout the stand, but they may be clumped for operational concerns or ecological opportunities.

## Roadless Area

The Licking Creek project area boundary encompasses a portion of the North Revilla Roadless Area 526. In the 2003 Roadless Inventory, Roadless Area 526 is 225,444 acres in size, of which 6,360 acres are within the project area (Figure 3-12). No harvest units or road building are proposed under any of the alternatives within the inventoried roadless area, and the proposed timber sale project would not affect its eligibility for wilderness designation. Additionally, no acres of roadless area subject to the Roadless Rule would be affected.

## Mitigation

The analysis documented in this Final EIS discloses the possible adverse impacts that may occur from implementing the actions proposed under each alternative. Measures have been formulated to mitigate or reduce these impacts. These measures were guided by the direction from the Forest Plan previously described in this chapter and in Chapter 1.

IDT specialists use on-the-ground inventories, computer (GIS) data, and aerial photographs to prepare the documents called unit cards for each harvest unit in the unit pool for the project. Similar cards are also prepared for each segment of road. Resource specialists include their concerns on the cards and then describe how the concerns are to be mitigated (if not completely avoided) in the design of each unit and road segment. These cards can be found in Appendix B of the Draft EIS.

Applicable Forest Plan Standards and Guidelines, the "Best Management Practices" (BMPs) used to meet the requirements of the Clean Water Act, and project-specific mitigation measures are identified on the unit and road cards (Appendix B of the Draft EIS).

Project-specific mitigation measures include protection for a rare plant, *Listera convallarioides*, found on the project area in four units. The locations been marked off with flagging to be protected during yarding.

## Monitoring

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 6 of the Forest Plan includes the



## 2 Alternatives

monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three categories of Forest Plan monitoring:

- **Implementation monitoring:** used to determine if the goals, objectives, standards and guidelines, and practices of the Forest Plan are implemented in accordance with the Forest Plan.
- **Effectiveness monitoring:** used to determine if the Forest Plan Standards and Guidelines and practices, as designed and implemented, are effective in accomplishing the desired result.
- **Validation monitoring:** used to determine whether the data, assumptions, and estimated effects used in developing the Forest Plan are correct.

Effectiveness and validation monitoring are not typically done as part of project implementation. Implementation monitoring, and any additional project-specific monitoring, is, however, an important aspect of the project.

Project-specific monitoring measures include surveys for band-tailed pigeons. Surveys are being made to locate birds and their potential nests in the spring/summer of 2003, and the population would be monitored for 3 years post-harvest to determine if the birds are present and continue to exhibit breeding behavior.

### **Routine Implementation Monitoring**

Routine implementation monitoring assesses whether the project was implemented as designed and whether or not it complies with the Forest Plan. Planning for routine implementation monitoring began with the preliminary design of harvest units and roads (see previous discussion of mitigation). The unit and road cards (Appendix B of the Draft EIS), and unit silvicultural prescriptions would be the basis for determining whether recommendations were implemented for various aspects of the Licking Creek Timber Sale project.

Routine implementation monitoring is part of the administration of a timber sale contract. The sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards, and the unit silvicultural prescriptions, are incorporated into contract documents; they then monitor performance relative to contract requirements. Input by resource staff specialists, such as fisheries biologists, soil scientists, hydrologists, and engineers, is regularly requested during this implementation monitoring process. These specialists provide technical advice when questions arise during project implementation.

Tongass National Forest staff annually conduct a review of BMP implementation and effectiveness. The results of this and other monitoring are summarized in a Tongass National Forest Annual Monitoring and Evaluation Report. This report provides information on how well the management direction of the Forest is being carried out, and measures the accomplishment of anticipated outputs, activities and effects.

## Alternatives Considered but Eliminated from Detailed Study

Additional alternatives were suggested during public scoping and in comments received on the Draft EIS. These were considered during the analysis but eliminated from detailed study.

**Maximize Timber Harvest:** Comments received during public scoping recommended to maximize timber harvest volume from a broad area surrounding the proposed sale area, including portions of the North Revilla Roadless Area 526. Reasons this alternative was eliminated from detailed consideration include: 1) harvest of all marketable timber in the project area would not meet Forest Plan Standards and Guidelines; 2) units within the Inventoried Roadless Area were not available for timber harvest during preparation of the Forest Plan Supplemental EIS and were dropped from consideration early in alternative development; and 3) inclusion of additional units and roads not considered in the proposed action (and not connected to the proposed action) is beyond the scope of analysis for this project.

This project-level environmental analysis evaluates the impacts of a specific proposal in a specific place and time. It does not attempt to set management direction for an area of land (which was done in the Forest Plan). It also does not preclude future proposals for additional timber harvest from the surrounding area, which would be considered on their own merits at that time.

**Partial Harvest, No Helicopter Yarding, and No New Road Construction:** Public comment received on the Draft EIS recommended a new alternative that included more partial harvest and eliminated road construction or helicopter yarding. Partial harvest is almost exclusively done with helicopter-yarding methods in Southeast Alaska; therefore, this alternative was not practical to design. In response to this comment, a new alternative, Alternative 6, was designed with no helicopter yarding and no new road construction; the silvicultural systems were maintained as primarily even aged. Alternative 6 is analyzed in detail, with the other project alternatives, in Chapter 3 of this Final EIS.

## Alternatives Considered in Detail

The Proposed Action (Alternative 4) and four other action alternatives are considered in detail. Alternative 1 is the No-action Alternative, under which the project area would have no new timber harvest or road construction at this time. The other action alternatives represent different means of satisfying the Purpose and Need than does the Proposed Action, by responding with different emphases to the issues discussed in Chapter 1. In the Final EIS, we include an additional alternative, Alternative 6, which was not considered in the Draft EIS. Maps of all alternatives considered in detail are provided at the end of this chapter. The map for Alternative 1, the No-action Alternative, represents the current condition of the project area. Larger-scale maps of the alternatives are contained in the project planning record.

Table 2-1  
Harvest Objectives and Practices of the Alternatives

Category	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Silvicultural Systems (acres)</b>						
Even-aged	0	253	551	784	737	214
Uneven-aged	0	0	22	6	28	0
<b>Total Acres</b>	<b>0</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>214</b>
<b>Harvest Systems (CCF)</b>						
Cable	0	5,293	12,537	22,964	8,421	10,287
Shovel	0	303	711	4,392	642	831
Helicopter	0	5,113	10,584	6,200	23,198	0
<b>Harvest Volume <sup>1/</sup> [CCF (MMBF)] <sup>2/</sup></b>	<b>0</b>	<b>10,709 (5.4)</b>	<b>23,832 (11.9)</b>	<b>33,556 (16.8)</b>	<b>32,261 (16.1)</b>	<b>11,118 (5.6)</b>
<b>Roads (miles)</b>						
New construction--	0	0.67	1.06	3.13	0	0
New construction-- temporary	0	0.83	1.11	2.36	0	0
<b>Total New Road Miles</b>	<b>0</b>	<b>1.50</b>	<b>2.17</b>	<b>5.49</b>	<b>0</b>	<b>0</b>
Reconstruction	0	4.11	4.11	1.65	4.11	0

<sup>1/</sup> Excluding right-of-way volume

<sup>2/</sup> MBF = 1000 board feet; CCF = 100 cubic feet

Source: D. Fletcher, 2002

### Alternative 1 - No Action

This alternative proposes no new timber harvest or road construction. It does not preclude timber harvest from other areas, or from Licking Creek at some time in the future. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) requires that a "no action" alternative be analyzed in every EIS. This alternative represents the baseline against which the other alternatives are compared. The map for Alternative 1 shows the current distribution of vegetation.

This alternative would not provide for an economic timber supply as described in the Purpose and Need (Chapter 1). It would have no adverse effects on water quality and fish habitat, old-growth associated wildlife, subsistence, or scenic views.

This alternative would not move the project area towards the desired future condition described in the Forest Plan. The existing condition would continue to be influenced by natural

disturbance processes, other timber sales scheduled to occur on National Forest System lands, and activities on other ownerships. The No-action Alternative provides a benchmark that allows the decision makers to compare the magnitude of the environmental effects of the action alternatives with the current condition.

## Alternative 2

This alternative was designed to minimize potential and cumulative effects to watersheds and fish habitat (Issue 3). A low level of timber harvest was dispersed across the watersheds in the project area, and areas of particular concern (e.g. Unit 8 and unnamed watershed 19) were avoided.

The timber volume proposed for harvest in Alternative 2 is 10,709 CCF (5.4 MMBF) on 253 acres of National Forest System lands. The project would provide opportunities for timber harvesting by local operators. It would convert 253 acres of old-growth stands to an even-aged condition. Timber would be removed by helicopter, cable and shovel logging.

Alternative 2 includes 0.67 miles of new (classified) road construction, 0.83 mile of temporary road, and reconstruction of 4.11 miles of existing road on National Forest System land, to move logs to the existing log transfer facility at Shoal Cove. After harvest activities are completed, all new project roads would be closed. Roads would be maintained at Maintenance Level I (closure), where custodial maintenance is performed to protect the road investment and reduce impacts to adjacent resources to an acceptable level. Non-motorized travel would not be restricted.

This alternative would harvest the following units: 1, 2, 11, 12, 14, 29, 30, 33, 34, 35, 38, 63, 68, and 70. It would use the following new and existing roads: 8400000, 8400420, 8400445, 8442000, 8444000, 8444200, 8444300, 8446000, and 8446100. (See the Alternative 2 map at the end of this chapter, and the unit and road cards in Appendix B of the Draft EIS.)

## Alternative 3

This alternative was designed to minimize potential and cumulative effects to critical deer winter range (Issue 2), by shifting timber harvest away from south-facing slopes and lower-elevation habitats to other areas.

The timber volume proposed for harvest in Alternative 3 is approximately 23,832 CCF (11.9 MMBF) on 573 acres of National Forest System lands. The project would provide opportunities for timber harvesting by local operators. It would convert 551 acres of old-growth stands to an even-aged condition, and convert 22 acres of old-growth stands to an uneven-aged condition. Timber would be removed by helicopter, cable and shovel logging.

Alternative 3 includes 1.06 miles of new (classified) road construction, 1.11 miles of temporary road, and reconstruction of 4.11 miles of existing road on National Forest System land, to move logs to the existing log transfer facility at Shoal Cove. After harvest activities are completed, all new project roads would be closed. Roads would be maintained at Maintenance Level I (closure), where custodial maintenance is performed to protect the road investment and reduce impacts to adjacent resources to an acceptable level. Non-motorized travel would not be restricted.

This alternative would harvest the following units: 1, 2, 9, 10, 11, 12, 14, 22, 24, 29, 30, 31, 33, 34, 35, 38, 39, 40, 63, 64, 65, 68, and 70. It would use the following new and existing roads: 8400000, 8400420, 8400445, 8400450, 8442000, 8444000, 8444200, 8444300, 8446000, and 8446100. (See the Alternative 3 map at the end of this chapter, and the unit and road cards in Appendix B of the Draft EIS.)

## Alternative 4 – Proposed Action

Alternative 4 was designed to respond to the issue of timber for the local economy (Issue 1). This alternative was designed to provide an economic timber sale with a moderate level of timber volume, not the maximum volume currently available in the project area, and to balance timber harvest with effects on other resources. The unharvested volume could be available for possible future harvest (such as a small sale contract).



## 2 Alternatives

The timber volume proposed for harvest in Alternative 4 is approximately 33,556 CCF (16.8 MMBF) on 790 acres of National Forest System lands. It would convert 784 acres of old-growth stands to an even-aged condition, and convert 6 acres to an uneven-aged condition. Timber would be removed by helicopter, cable and shovel logging.

Alternative 4 includes 3.13 miles of new (classified) road construction, 2.36 miles of temporary road, and reconstruction of 1.65 miles of existing road on National Forest System land, to move logs to the existing log transfer facility at Shoal Cove. After harvest activities are completed, all new project roads would be closed. Roads would be maintained at Maintenance Level I (closure), where custodial maintenance is performed to protect the road investment and reduce impacts to adjacent resources to an acceptable level. Non-motorized travel would not be restricted.

This alternative would harvest the following units: 8, 9, 10, 11, 19, 24, 29, 31, 34, 35, 40, 43, 44, 50, 51, 63, 65, 67, 68, 70, and 71. It would use the following new and existing roads: 8400000, 8400420, 8400445, 8400450, 8400451, 8400470, 8442000, 8444000, 8444050, 8444051, 8444060, 8444200, 8446000, and 8446150. (See the Alternative 4 map at the end of this chapter, and the unit and road cards in Appendix B of the Draft EIS.)

### Alternative 5

Alternative 5 was designed to respond to the issue of new road construction (Issue 4), by conducting all timber harvest from existing roads in the project area and not constructing any new roads.

The timber volume proposed for harvest in Alternative 5 is approximately 32,261 CCF (16.1 MMBF) on 765 acres of National Forest System lands. The project would provide opportunities for timber harvesting by local operators. It would convert 737 acres of old-growth stands to an even-aged condition, and convert 28 acres of old-growth stands to an uneven-aged condition. Timber would be removed primarily by helicopter (72 percent of the volume), but also by cable and shovel logging.

No new road construction is proposed under Alternative 5. It would require reconstruction of 4.11 miles of existing road on National Forest System lands, to move logs to the existing log transfer facility at Shoal Cove.

This alternative would harvest the following units: 1, 2, 8, 9, 10, 12, 19, 22, 24, 29, 31, 33, 34, 38, 39, 40, 50, 63, 64, 67, 68, 70, and 71. It would use the following existing roads: 8400000, 8400420, 8400450, 8442000, 8444000, 8446000, and 8446100. (See the Alternative 5 map at the end of this chapter, and the unit and road cards in Appendix B of the Draft EIS.)

### Alternative 6

Alternative 6, like Alternative 5, was designed to respond to the issue of new road construction (Issue 4), by conducting all timber harvest from existing roads in the project area and not constructing any new roads. In response to public comment, it does not utilize helicopter yarding and it utilizes few miles of road to reduce maintenance costs. Consequently, only those portions of units accessible from existing roads, using cable and shovel yarding systems, would be harvested in this alternative.

The timber volume proposed for harvest in Alternative 6 is approximately 11,118 CCF (5.6 MMBF) on 214 acres of National Forest System lands. The project would provide opportunities for timber harvesting by local operators. It would convert all harvested acres of old-growth stands to an even-aged condition. Timber would be removed by cable and shovel logging.

No new road construction or road reconstruction is proposed under Alternative 6. Existing roads would be used to move logs to the existing log transfer facility at Shoal Cove.

This alternative would harvest timber from portions of the following units: 8, 10, 19, 50, 65, 67, and 68. It would use the following existing roads: 8400000, 8400420, 8400450, 8444000, and 8446000. (See the Alternative 6 map at the end of this chapter, and the unit and road cards in Appendix B of the Draft EIS.)



## Comparison of Alternatives

This section compares outputs, objectives and effects of the alternatives in terms of the significant issues for the Licking Creek Timber Sale project. The discussions of effects are summarized from Chapter 3, which should be consulted for a full understanding of these and other environmental consequences. The table below provides an overview comparison of information from the alternative descriptions and Chapter 3 relevant to the issues. This information will be used in the discussions that follow.

Table 2-2  
Comparison of Alternatives by Issue

Issues	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Issue 1: Timber Economics</b>						
Harvest Volume CCF (MMBF)		10,709 (5.4)	23,832 (11.9)	33,556 (16.8)	32,261 (16.1)	11,118 (5.6)
Average harvest cost <sup>1/</sup> (\$/CCF)	0	169.52	153.94	130.64	162.78	89.76
Expected bid value \$ (parenthesis = deficit value)		(332,129)	(366,886)	278,578	(753,807)	566,037
Direct income generated (millions \$)	0	1.26	2.80	3.95	3.80	1.30
Direct job years created <sup>2/</sup>	0	28	63	89	85	29
<b>Issue 2: Wildlife Habitats <sup>3/</sup></b>						
Reduction in deer habitat capability from existing conditions	0	2%	4%	9%	5%	3%
Cumulative reduction in deer habitat capability since 1954	33%	34%	36%	39%	36%	35%
Reduction in marten high-value habitat capability (from existing)	0	4%	11%	14%	15%	5%
Post-harvest open road density - VCU 7460 (mi./sq. mi.)	0.8	0.8	0.8	0.8	0.8	0.8
Post-harvest open road density - WAA 406 (mi./sq. mi.)	0.3	0.3	0.3	0.3	0.3	0.3
<b>Issue 3: Watersheds &amp; Fish Habitat</b>						
Class II stream crossings (reconstructed) <sup>4/</sup> (2 bridges, 1 culvert)	0	3	3	3	3	0
Class III stream crossings (new) <sup>4/</sup>	0	0	1	2	0	0
Class IV stream crossings (new) <sup>4/</sup>	0	0	0	2	0	0
<b>Issue 4: Transportation</b>						
Estimated cost of road construction and maintenance (\$)	0	532,150	632,850	1,078,900	326,000	140,000
Possible significant effects from roads on soils and water quality	No	No	No	No	No	No
<b>Other Concerns</b>						
Possibility of adverse effect on high-vulnerability karst	No	No	No	No	No	No
Number of proposed harvest units visible from viewpoints	0	2	5	9	9	4
Significant possibility of significant restriction on subsistence use	No	No	No	No	No	No

<sup>1/</sup> For optional removal of utility logs.

<sup>2/</sup> Based on 5.28 direct jobs per MMBF; job year/harvest ratio from Forest Plan

<sup>3/</sup> Wildlife effects are reported for the project area, unless otherwise noted.

<sup>4/</sup> All new and reconstructed stream crossings would meet standards to provide fish passage.

Source: K. O'Connor, 2002

# 2 Alternatives

## Issues

### Issue 1: Timber Economics

Alternative 1 proposes no timber harvest, and thus offers no opportunity for timber-related employment or personal income. The action alternatives would result in timber-related employment opportunities in proportion to their total harvest volumes. Alternative 4 offers the most timber volume, generates the highest potential number of jobs, and has a positive expected bid value. Alternative 5 offers the second-highest timber volume and generates the second-highest number of jobs, but has the most negative expected bid value at (\$753,807) of all the alternatives due to a high percentage of helicopter harvest. Alternative 2 offers the least timber volume, and generates the fewest jobs. Alternative 3 offers the third-highest timber volume and generates the third-highest number of jobs. These last two alternatives also have negative expected bid values of (\$332,129) for Alternative 2 and (\$366,886) for Alternative 3. Alternative 6 offers volume and generates jobs similar to Alternative 2, but is substantially more economically efficient than Alternative 2, with a positive expected bid value of \$566,037 and the lowest cost-per-CCF to harvest.

### Issue 2: Wildlife Habitat

Deer habitat capability is currently above the minimum recommended density to maintain wolf populations in the project area, and this condition would continue under all action alternatives. The numbers of deer would remain adequate to sustain wolf predation and expected hunting levels and subsistence use. The action alternatives would reduce the deer habitat capability within the project area, with the effect proportional to the proposed harvest. Alternative 4 would have the greatest effect, followed in decreasing order by Alternative 5, Alternative 3, Alternative 6, and Alternative 2 (Table 2-2). The proposed timber harvest, for all alternatives, would reduce current deer habitat capability within WAA 406 by only 1 percent. For all action alternatives, post-harvest open road densities would be within the recommended levels for wolves, but above the recommended maximum densities for marten. However, these open roads are not connected to any communities and motor vehicle traffic is light, and the road densities should not adversely affect marten. After harvest and silvicultural activities are completed, all new roads would be closed.

### Issue 3: Watersheds and Fish Habitat

Anadromous fish (salmon) habitat within the Licking Creek project area is minimal, and the project area watersheds are, generally, unproductive for these species. With the application of Forest Plan Standards and Guidelines, including those for riparian areas, risks to freshwater and marine resources and Essential Fish Habitat would be minimized. Recreational fishing access would be unaffected, as all new roads would be closed after timber harvest and associated silvicultural activities. Of the action alternatives, Alternative 4 would have the greatest potential effect on fish and water resources, followed by Alternative 5, Alternative 3, Alternative 2, and Alternative 6. No new stream crossings are proposed on Class I or II streams under any of the action alternatives. Three existing Class II crossings would be reconstructed (two bridges and one culvert) under Alternatives 2, 3, 4, and 5.

### Issue 4: Transportation

Forest Plan Standards and Guidelines and Best Management Practices (BMPs) would be applied to all road construction activities for all alternatives. New roads planned for Alternatives 2, 3, and 4 would be located to minimize crossing of karst features, wetlands, and slopes and soils at high risk for mass movement. Application of mitigation and BMP measures would minimize erosion of road surfaces, and new stream crossings would be designed to minimize sediment delivery to streams. In order to obtain an affordable road system with all roads properly maintained, the majority of roads (and all new roads) would be closed after completion of timber harvest and silvicultural activities. No new roads are planned for Alternative 5 or 6. No new roads or other harvest activities are proposed within any inventoried roadless areas.

**Other Concerns**

**Karst**

Substantial karst mineral deposits were found in the project area during field reconnaissance, including some highly vulnerable features such as caves and sinkholes. All timber harvest and road construction proposed for the action alternatives would meet Forest Plan Standards and Guidelines for management of karst resources, and avoid high-vulnerability karst and cave features. See also Chapter 3, Geology, Minerals, and Karst.

**Scenery**

Timber harvest units were designed during planning and alternative development to minimize impacts on scenery. Under Alternative 2, only two harvest units would be visible from viewpoints along Carroll Inlet. Portions of five harvest units would be visible under Alternative 3, nine harvest units under Alternatives 4 and 5, and four harvest units under Alternative 6. All timber harvest proposed for the action alternatives in this project, combined with the existing harvest, would meet the Visual Quality Objectives for the project area in all viewsheds.

However, after the harvest of one unit in the Madder Timber Sale, which is scheduled to be sold, the Calamity Creek and Marble Creek area viewshed would not quite meet Visual Quality Objectives from one viewpoint in Carroll Inlet. None of the Licking Creek alternatives would substantially add to the impacts created by the Madder Timber Sale unit. See also Chapter 3, Scenery.

**Subsistence**

The project area is not within a high-use subsistence area, and no significant concerns about subsistence resources and uses were identified during public scoping or consultation with tribal governments. Most deer hunting in the project area is by Ketchikan (non-rural) residents, and subsistence use is very light. The proposed timber harvest, for all alternatives, would reduce current deer habitat capability within WAA 406 by only 1 percent. Deer hunting demand, for both subsistence use and non-subsistence hunting, is expected to remain below 10 percent of the habitat capability, which is sustainable. For all subsistence resources, it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction in subsistence resources or uses in the project area. See also Chapter 3, Subsistence.



## 2 Alternatives



Licking Creek anadromous fish barrier; photo by Ricardo Sainz

# Land Use Designations (Alternative 1) NO ACTION







## Land Use Designations (LUD) :

-  Timber Production (TM)  
Maximum Development
-  Modified landscape (ML)  
Natural Setting  
and Timber Harvest
-  Old Growth Reserves  
(OGR) Current Location)  
Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater

## Previous Activity :

-  Previous and Pending  
Harvest Areas
-  Existing or  
Pending Roads

## Other lines:

-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary

Mapscale 1: 50000



Contour Interval - 100 feet



Note: Compiled from various dig  
geographic data. This map may not  
meet National Map accuracy  
standards.

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# Land Use Designations (Alternative 1) NO ACTION

## Land Use Designations (LUD) :







-  Timber Production (TM) Maximum Development
-  Modified landscape (ML) Natural Setting and Timber Harvest
-  Old Growth Reserves (OGR) Current Location) Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater

## Previous Activity :

-  Previous and Pending Harvest Areas

-  Existing or Pending Roads

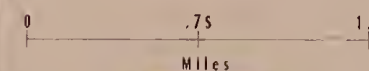
## Other lines:

-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary

Mapscale 1: 50000



Contour Interval - 100 feet



Enlarged Area

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Vicinity Map scale - 1:450,000

Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.

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April 11, 2003 Original Script A. Grundy














# Existing Conditions (Alternative 1) NO ACTION

## Land and Forest Conditions :







-  Productive Old Growth Forest
-  Non-Productive Old Growth Forest Lands
-  Non-Forested Lands
-  Old Growth Reserves (OGR) Current Location Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater

## Previous Activity :

-  Previous and Pending Harvest Areas

-  Existing or Pending Roads

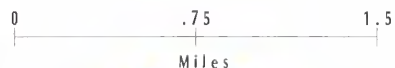
## Other lines:

-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary

Mapscale 1: 50000



Contour Interval = 100 feet



Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.

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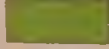


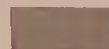
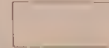

Enlarged Area

Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.



Existing Conditions  
(Alternative 1)  
NO ACTION

Land and Forest Conditions :


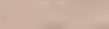



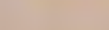
-  Productive Old Growth Forest
-  Non-Productive Old Growth Forest Lands
-  Non-Forested Lands
-  Old Growth Reserves (OGR) Current Location Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater

Previous Activity :

-  Previous and Pending Harvest Areas

-  Existing or Pending Roads

Other lines:

-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary

Mapscale 1: 50000



Contour Interval - 100 feet









Enlarged Area

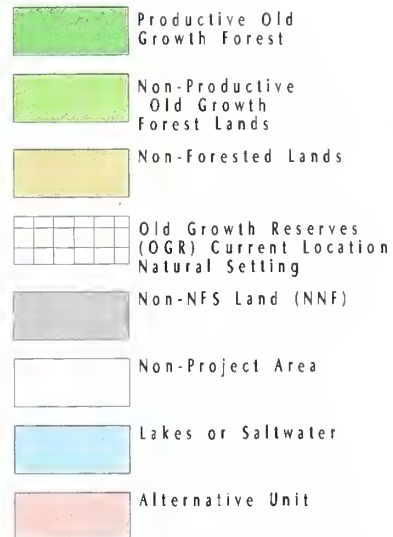
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Vicinity Map scale - 1:450,000

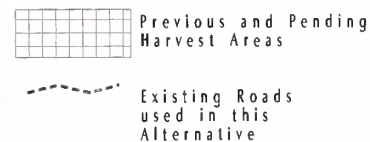
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## Action Alternative Alternative 2

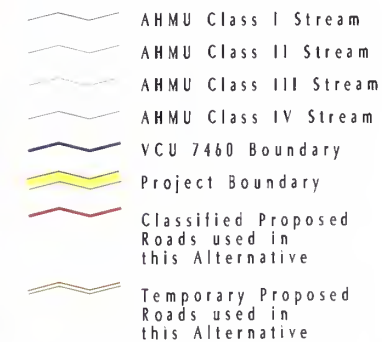
### Land and Forest Conditions :



### Previous Activity :



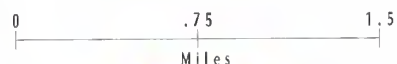
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Contour Interval = 100 feet



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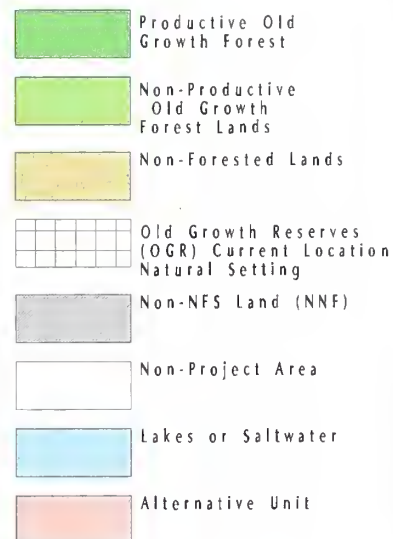




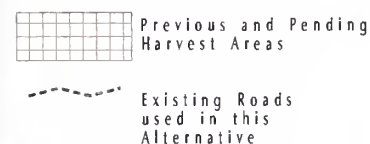


# Action Alternative Alternative 3

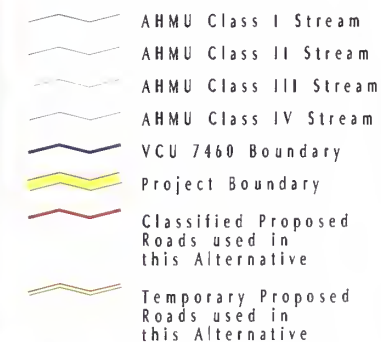
## Land and Forest Conditions :



## Previous Activity :



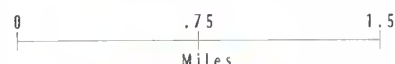
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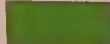
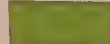



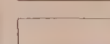
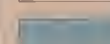

Note: Compiled from various dig geographic data. This map may not meet National Map accuracy standards.





# Action Alternative Alternative 3









## Land and Forest Conditions :

-  Productive Old Growth Forest
-  Non-Productive Old Growth Forest Lands
-  Non-Forested Lands
-  Old Growth Reserves (OGR) Current Location Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater
-  Alternative Unit

## Previous Activity :

-  Previous and Pending Harvest Areas
-  Existing Roads used in this Alternative

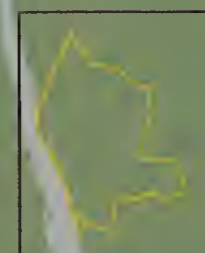
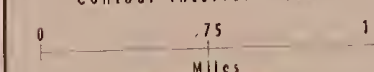
## Other lines:

-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary
-  Classified Proposed Roads used in this Alternative
-  Temporary Proposed Roads used in this Alternative

Mapscale 1: 50000



Contour Interval - 100 feet



Enlarged Area

Vicinity Map scale - 1:450,000

Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.







Enlarged Area

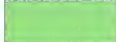


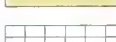




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Vicinity Map scale - 1:450,000



Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.

# Action Alternative Alternative 4









## Land and Forest Conditions :

-  Productive Old Growth Forest
-  Non-Productive Old Growth Forest Lands
-  Non-Forested Lands
-  Old Growth Reserves (OGR) Current Location Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater
-  Alternative Unit

## Previous Activity :

-  Previous and Pending Harvest Areas
-  Existing Roads used in this Alternative

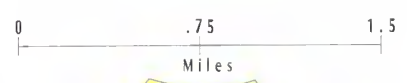
## Other lines:

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-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary
-  Classified Proposed Roads used in this Alternative
-  Temporary Proposed Roads used in this Alternative

Mapscale 1: 50000



Contour Interval - 100 feet









Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.

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June 12, 2003 Original Script A. Grundy



# Action Alternative Alternative 4

## Land and Forest Conditions :

- Productive Old Growth Forest
- Non-Productive Old Growth Forest Lands
- Non-Forested Lands
- Old Growth Reserves (OGR) Current Location Natural Setting
- Non-NFS Land (NNF)
- Non-Project Area
- Lakes or Saltwater
- Alternative Unit

## Previous Activity :

- Previous and Pending Harvest Areas
- Existing Roads used in this Alternative

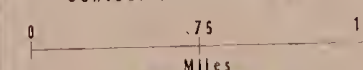
## Other lines:

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- AHMU Class II Stream
- AHMU Class III Stream
- AHMU Class IV Stream
- VCU 7460 Boundary
- Project Boundary
- Classified Proposed Roads used in this Alternative
- Temporary Proposed Roads used in this Alternative

Mapscale 1: 50000



Contour Interval - 100 feet





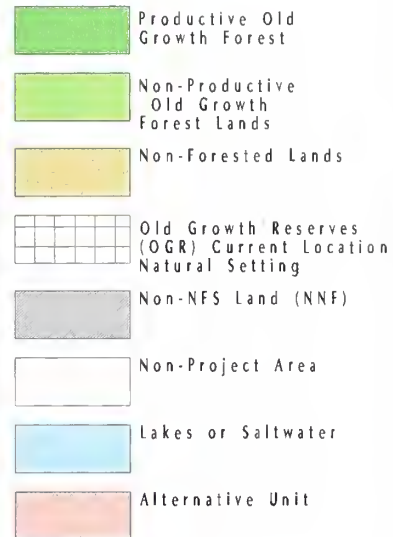




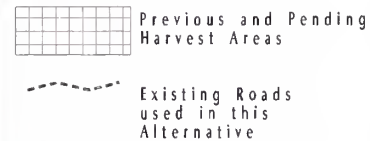


## Action Alternative Alternative 5

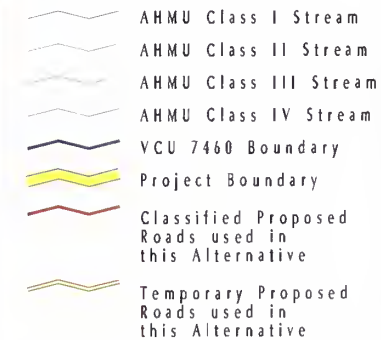
### Land and Forest Conditions :



### Previous Activity :



### Other lines:



Mapscale 1: 50000



Contour Interval = 100 feet



Note: Compiled from various dig geographic data. This map may not meet National Map accuracy standards.







Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.



# Action Alternative Alternative 5

Land and Forest Conditions :

- Productive Old Growth Forest
- Non-Productive Old Growth Forest Lands
- Non-Forested Lands
- Old Growth Reserves (OGR) Current Location Natural Setting
- Non-NFS Land (NNF)
- Non-Project Area
- Lakes or Saltwater
- Alternative Unit

Previous Activity :

- Previous and Pending Harvest Areas
- Existing Roads used in this Alternative

Other lines:

- AHMU Class I Stream
- AHMU Class II Stream
- AHMU Class III Stream
- AHMU Class IV Stream
- VCU 7460 Boundary
- Project Boundary
- Classified Proposed Roads used in this Alternative
- Temporary Proposed Roads used in this Alternative

Mapscale 1: 50000

Contour Interval = 100 feet

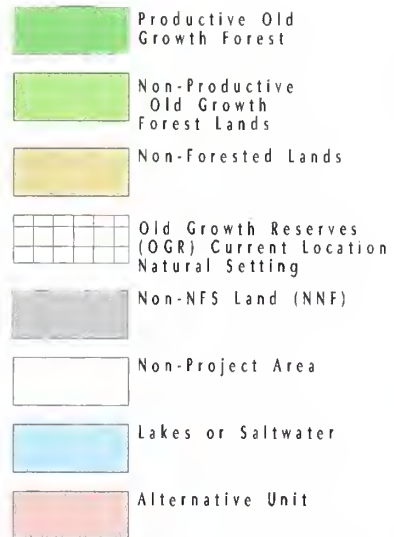
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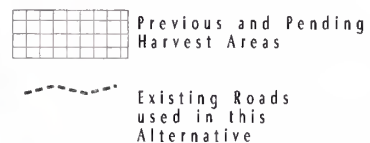


# Action Alternative Alternative 6

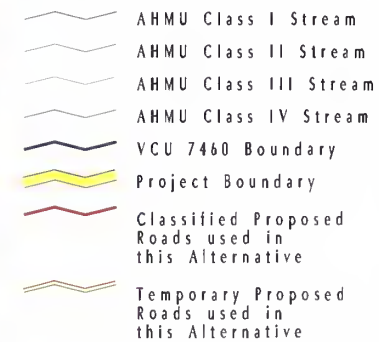
## Land and Forest Conditions :



## Previous Activity :



## Other lines:



Mapscale 1: 50000



Contour Interval = 100 feet



Enlarged Area

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Vicinity Map scale = 1:450,000

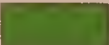
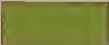
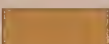





Note: Compiled from various dig geographic data. This map may not meet National Map accuracy standards.






# Action Alternative Alternative 6









## Land and Forest Conditions :

-  Productive Old Growth Forest
-  Non-Productive Old Growth Forest Lands
-  Non-Forested Lands
-  Old Growth Reserves (OGR) Current Location Natural Setting
-  Non-NFS Land (NNF)
-  Non-Project Area
-  Lakes or Saltwater
-  Alternative Unit

## Previous Activity :

-  Previous and Pending Harvest Areas
-  Existing Roads used in this Alternative

## Other lines:

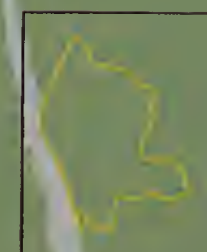
-  AHMU Class I Stream
-  AHMU Class II Stream
-  AHMU Class III Stream
-  AHMU Class IV Stream
-  VCU 7460 Boundary
-  Project Boundary
-  Classified Proposed Roads used in this Alternative
-  Temporary Proposed Roads used in this Alternative

Mapscale 1: 50000



Contour Interval - 100 feet

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Miles



Enlarged Area

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Vicinity Map scale - 1:450,000

Note: Compiled from various digital geographic data. This map may not meet National Map accuracy standards.

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June 13, 2003 Original Script A. Grundy





# **Chapter 3**

## **Affected Environment and Environmental Consequences**



# Chapter 3

## Affected Environment and Environmental Consequences

### Introduction

In this chapter, we describe the environment that would be modified by the Licking Creek project (affected environment), and the potential effects of the alternatives on the environment (environmental consequences). We based the comparison of alternatives presented in Chapter 2 (Table 2-2) on this information. This chapter is divided into two main sections:

**Effects on the Issues**—In this section, we describe the effects of each alternative on the four key issues.

**Other Concerns**—Following the four issues, we summarize the effects on other resources, which are not considered to be key issues for this project but are valuable to discuss.

### Analyzing Effects

Environmental consequences are the effects of implementing an alternative on the physical, biological, social and economic environment. The Council on Environmental Quality (CEQ) regulations, which guide implementation of the National Environmental Policy Act (NEPA), includes several specific categories to use for analysis of environmental consequences. We quantify these effects where possible, and include qualitative discussions. We also describe how potential adverse effects would be reduced or mitigated. (These are described for each specific site in the unit and road cards, Appendix B of the Draft EIS.)

#### **Direct, Indirect and Cumulative Effects**

Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the cause or action. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. The scope by which effects are measured is not necessarily limited to the project area. The geographical areas within which the effects of activities are analyzed are identified below (under Land Divisions) and within the applicable resource section. Cumulative effects analysis for the Licking Creek project was completed to comply with the direction in the 1997 Forest Plan.

#### **Past and Present Actions**

Approximately 2,954 acres of timber harvest has occurred in the project area, as follows:

# 3 Environment and Effects

- The first large commercial entries began in 1954. Between 1954 and 1962, 284 acres were harvested from the shoreline, using an A-frame logging method.
- Beginning around 1971, the project area was roaded and conventional cable harvest was initiated.
- About 1,330 acres were harvested from 1972 to 1979. (This includes 103 acres of private land harvested in 1974.)
- From 1980 to 1990, an additional 803 acres were harvested, primarily in the Marble Creek and Twin Lakes Timber Sales.
- From 1991 to 1996, an additional 537 acres were harvested in the Slackline and Swing Timber Sales.

## Reasonably Foreseeable Future Actions

An analysis of cumulative effects must also include “reasonably foreseeable future actions” (40 CFR 1508.7). Reasonably foreseeable actions are those that are currently planned or scheduled to occur. The *Tongass Ten Year Timber Sale Schedule* is the instrument through which future timber sales are scheduled. For the purposes of this analysis, reasonably foreseeable future actions are considered to be those that will occur within the next 10 years. The following timber sales have been sold or are planned near the Licking Creek project area, and are within Wildlife Analysis Area 406.

- Sea Level Timber Sale EIS: The Buckdance and Madder Timber Sales are scheduled to be sold in 2004. Seven Madder units, totaling 249 acres, with approximately 17,000 CCF (8.5 MMBF), are within the Licking Creek project area.
- Mop Point/91 Knot Timber Sale EA: The decision was signed in 2001. Two small sales of approximately 6,000 CCF (3 MMBF) are scheduled to be sold in 2004. One 9-acre unit is within the Licking Creek project area.

## Unavoidable Adverse Effects

Unavoidable adverse environmental effects are those that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of activities. The interdisciplinary procedure used to identify specific harvest units and roads is designed to eliminate or lessen significant adverse consequences. The application of Forest Plan Standards and Guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. Regardless of the use of these measures or the alternative selected, some adverse effects will occur.

## Short-Term Use and Long-Term Productivity

Short-term uses, and their effects, are those that occur annually or within the first 10 years of project implementation. Long-term productivity refers to the capability of the land and resources to continue producing goods and services long after the project has been implemented. Under the Multiple-Use Sustained-Yield Act, and the National Forest Management Act, all renewable resources are to be managed in such a way that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be reestablished and grown again if the long-term productivity of the land is maintained. This long-term productivity is maintained through the application of the resource protection measures described in Chapter 2, in particular those pertaining to the soil and water resources. These are also discussed throughout this chapter, in particular for silviculture and soils.

## Irreversible and Irretrievable Commitments

Irreversible commitments describe a loss of future options. Irreversible applies primarily to the effects of use of nonrenewable resources such as mineral extraction or destruction of a heritage



resource site. Once these resources are gone, they cannot be replaced. Irreversible can also apply to factors such as soil productivity that are renewable only over long periods of time.

Irretrievable commitments apply to the loss of production, harvest or use of natural resources. For example, some or all of the timber production from an area is lost irretrievably while an area is serving as a winter sports site. The production lost is irretrievable, but the action is not irreversible because if the use changes, it is possible to resume timber production.

The use of these terms to include in discussions of environmental consequences is found in 40 CFR 1502.16. The definitions above are found in the Forest Service handbook (FSH 1909.15, 05). The disclosure of effects in this chapter is organized by direct, indirect and cumulative effects. Where necessary, irreversible commitments are identified, but generally timber harvest and associated activities are considered irretrievable commitments of resources.

## Land Divisions

The land area of the Tongass National Forest has been divided in several ways to describe the different resources and to analyze how they may be affected by Forest Plan and project-level decisions. These divisions vary by resource, since the relationship of each resource to geographic conditions and zones also varies. The allocation of Forest Plan land use designations (LUDs, discussed in Chapter I) is one such division. Three other divisions important for the effects analysis - Watersheds, Value Comparison Units (VCUs) and Wildlife Analysis Areas (WAAs) - are briefly described here. The Interdisciplinary Team identifies the boundary of a project area during project planning. A project area may contain several watersheds, VCUs, and WAAs, and/or portions of these land divisions.

### Land Divisions Used to Analyze Environmental Effects for Each Resource

Resource	Analysis Areas
Issue 1: Timber Economics	Project Area
Issue 2: Wildlife	Project Area, VCU 7460, WAA 406
Issue 3: Watersheds & Fish Habitat	Watersheds (within Project Area)
Issue 4: Transportation	Project Area
Biodiversity	Project Area, VCU 7460, WAA 406
Geology, Minerals, and Karst	Project Area
Heritage Resources	Project Area
Log Transfer Facilities	Timber sales using the Shoal Cove road system
Recreation	Project Area
Roadless Area	Project Area, Inventoried Roadless Area #526
Scenery	Project Area
Silviculture & Timber Mgmt	Project Area
Soils	Project Area
Subsistence	Project Area, VCU 7460, WAA 406
Threatened/Endangered Species	Project Area
Wetlands and Floodplains	Project Area

### **Watersheds**

A watershed is an area that contributes water to a drainage or stream and from which all surface water drains to a common point. Watersheds can range from tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Stream Order is a useful classification based on branching of streams. A number from one to six or higher, ranked from headwaters to river terminus, designates the relative position of a stream or stream segment in a drainage basin. First-order streams have no discrete tributaries; the junction of two first-order streams produces a second-order stream; the junction of two second-order streams produces a third-order stream; etc.

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Watershed sizes are based on the stream order so that a first-order watershed contains only a first-order stream network. The project area contains nine watersheds: two second-order watersheds, two third-order watersheds, and two fourth-order watersheds. Three of the first-order watersheds are lumped together for analysis purposes; see Figure 3-3.

## **Value Comparison Units (VCUs)**

These are distinct geographic areas, each encompassing a drainage basin containing one or more large stream systems. The boundaries usually follow major watershed divides. The Licking Creek project area lies within VCU 7460, as discussed in Chapter 1. Chapter 1 also includes a map showing the location of this VCU.

## **Wildlife Analysis Areas (WAAs)**

These are Forest Service land divisions that correspond to the "Minor Harvest Areas" used by the Alaska Department of Fish and Game. There are approximately 190 WAAs that apply to the Tongass National Forest. The Licking Creek project area lies within WAA 406. Information estimated by WAA is used in the wildlife and subsistence analyses.

## **Inventoried Roadless Area (IRA)**

Inventoried Roadless Areas are undeveloped areas of National Forest System lands that met the minimum criteria for wilderness consideration under the Wilderness Act and were inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process, subsequent assessments, or forest planning. They typically exceed 5,000 acres. The Licking Creek project area overlays a small portion of Inventoried Roadless Area #526, but no actions are proposed within the roadless area boundary. See the "Roadless Area" section of this chapter.

## **Available Information**

We store much of the Tongass National Forest resource data in an electronic database formatted for a geographic information system (GIS). The Forest Service uses GIS software to assist in the analysis of this data. GIS data is available in tabular (numerical) format, and as plots displaying data in map format. GIS data is based on our most current information. For this EIS, all of the maps, and most of the numerical analyses, are based on GIS resource data.

Much resource information that was analyzed in other planning documents (such as the Forest Plan Final EIS, other project EISs, and detailed resource reports) was relevant to this project. Where applicable, we have briefly summarized and referenced this information in the resource sections.

Our knowledge about the relationships and conditions of wildlife, fish, forests, jobs and communities is incomplete. The ecology and management of a large forested area are complex and developing sciences. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interactions of resource supply, communities, and economies are difficult to predict precisely. However, the basic data and central relationships are sufficiently established in the respective sciences for the responsible official to make a reasoned choice between the alternatives, and to adequately assess and disclose the potential adverse environmental consequences.

## **Plans of Other Agencies**

The CEQ regulations implementing NEPA require a determination of possible conflicts between the Proposed Action and the objectives of Federal, State, and local land use plans, policies, and controls for the area. The major land use regulations of concern are Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the Coastal Zone Management Act (CZMA), and the State of Alaska's Forest Practices Act. See the "Findings and Disclosures" section of Chapter 2 for discussion of compliance with these laws. State compliance is also discussed at the end of Chapter 1. ANILCA Section 810 requirements pertain to subsistence; these are also discussed in the Subsistence section of this chapter.

The State of Alaska has completed a Central/Southern Southeast Area Plan describing possible projects on State land in the southern portion of Southeast Alaska. Projects on State land adjacent to National Forest System land could increase the impact of cumulative effects from

National Forest System land projects. There is no State land adjacent to the project area boundary.

### **Effects on the Issues**

The Council on Environmental Quality (CEQ) issues guidance to Federal agencies to determine the significant issues concerning any proposal, and to eliminate those issues that are not significant, or that are outside the scope of this document. With the help of the public and other agencies, we identified the four issues to be examined in detail for the proposed project. In the following sections, we describe the environmental effects of each of our alternatives as they relate to these four issues.

## Issue 1: Timber Economics

### Issue Statement: Timber harvest in the project area may affect the local and regional economies.

This project has the potential to affect employment and the economy of local communities. This was raised as an issue during public scoping. Public comments indicated concern about current changes in the timber industry. Some voiced strong support for timber harvest in the project area. Others expressed concern that a sale may not yield a net return to the Federal treasury ("below-cost sale"). The amount of wood harvested and any infrastructure developed with this entry may affect availability and costs associated with future entries for timber harvest.

### Affected Environment

#### Community Economic Base

#### Employment in Southeast Alaska

Approximately 80 percent of Southeast Alaska is within the Tongass National Forest, which extends 500 miles from Ketchikan in the southeast to Yakutat in the northwest. With little private land available, the region is sparsely settled. Approximately 73,000 people live in 32 towns and villages located in and around the Forest. The regional economy has changed in the last decade. Between 1990 and 2000, regional employment in services and the retail trade showed large growth while manufacturing jobs declined, reflecting growth in recreation and tourism-based employment and a 78 percent decrease in timber-related jobs (Forest Plan Final Supplemental EIS, 2003, page 3-242). The communities of Southeast Alaska depend on the Tongass National Forest to provide the foundation for natural resource-based industries, which comprised 23 percent of regional employment in 2001. Within this sector, wood products comprised 9 percent, commercial fishing and fish processing, 37 percent, recreation and tourism, 51 percent, and mining and mineral development, 3 percent (Forest Plan Final Supplemental EIS, 2003, page 3-245). Many residents also depend heavily on subsistence hunting and fishing to meet their basic needs. There is very little private land in the region to provide these resources. Appropriate management of the Tongass' natural resources is, therefore, extremely important for local communities and the overall regional economy. An overview of regional employment is provided in the Economics resource report in the Licking Creek project planning records.

#### Employment in the Project Area

Three communities near Carroll Inlet are directly affected by this project: Ketchikan and Saxman on Revillagigedo Island, and Metlakatla on Annette Island.

Ketchikan (population 13,900) is the 4th largest community in Alaska. Timber and fishing have been the economic foundation of the community; however, the Ketchikan Pulp Company, a major employer for 40 years, closed in 1997, and employment in the fishing and seafood industry has also declined in recent years. In 2001, Gateway Forest Products filed for bankruptcy, and the operations are shut down; the Ketchikan Gateway Borough purchased the veneer plant (capacity of 30,000 MBF) and is currently looking for an operator. The Herring Bay Lumber Company is currently idle. The Pacific Log and Lumber sawmill is in operation with a capacity of 33,600 MBF (Wilson 2003). Today, the cornerstones of the Ketchikan economy include tourism, government, airport, and shipyard services, in addition to commercial fishing and timber. Sport fishing and hunting are important recreational activities for area residents.



Saxman is immediately adjacent to Ketchikan and its economy is linked to the larger community. Saxman depends on the tourist industry generated in Ketchikan and on local subsistence resources.

In the larger Ketchikan Gateway Borough area (including Saxman), wood products comprised about 9.4 percent of total employment, and recreation and tourism about 17 percent, in 2001. Seafood processing is more dominant in the more southern Southeast Alaskan communities. (Forest Plan Final Supplemental EIS, 2003, page 3-312 to 3-313.)

The community of Metlakatla, on the Annette Island Indian Reservation, has recently lost several major sources of employment: the cannery and two sawmills. Metlakatla is currently planning a water-bottling plant and small forest product utilization at its mill site. The community continues to struggle with high unemployment and economic decline. Should the sawmill resume operation at some time in the future, small sales on National Forest System lands that they could qualify to bid on could provide jobs for the community. The people of Metlakatla are heavily dependent on subsistence resources.

Additional sawmills are in operation on Prince of Wales Island (total capacity of 131,875 MBF), Wrangell (65,000 MBF), and Petersburg (23,000 MBF) (Wilson 2003).

## **Non-timber Employment and Demand**

The following discussion is summarized from the *Tongass Land Management Plan Revision Final Supplemental EIS—Roadless Area Evaluation for Wilderness Recommendations (2003)*, Chapter 3, Economic and Social Environment.

Recreation and tourism within Southeast Alaska has increased significantly since 1990, primarily in non-Alaskan resident recreation use. Surveys indicate that these visitors, a majority of which are cruise ship passengers, are generally older, often purchase package tours, use many expensive services, and spend relatively little time in remote settings. Recreation and tourism-based employment is expected to increase by 17 percent in 10 years, with most of this growth due to projected change in non-Tongass, nonresident, recreation related employment. However, annual cruise ship data for 2000 suggest that these visitors accounted for at least 60 percent of the total visitation to the Tongass National Forest in 2001. Cruise ship companies have heavily marketed Forest-related activities in recent years, and many passengers take at least one trip to the Forest (for example, flightseeing tours to Misty Fiords). Recreational use data for the Tongass National Forest collected between 1984 and 1995 found that semi-primitive motorized recreation demand currently exceeds supply at identified recreation places, but not across the entire Forest. (See the Recreation section in this chapter for an explanation of “recreation places.”) By contrast, roadless areas and wilderness were underutilized and were expected to remain so into the future.

There is not expected to be any significant change to commercial fishing or fish processing industries over the next decade as a result of National Forest activities. Much of the future of the fishing industry in Southeast Alaska will be dependent upon occurrences outside of the Tongass National Forest such as off-shore harvest levels and changes in ocean currents. In addition, a large segment of the commercial fishing industry operates under a limited entry harvest system, and the number of permit holders is stable from year to year.

## **The Timber Industry**

### **Forest Products Employment**

The forest products industry has been an important part of the economy of Southeast Alaska since the 1950s. Recent forest products employment data are presented in Table 3-1. From 1987 through 1996, the forest products industry provided direct employment for an average of 2,791 workers. Indirect employment, which includes related service activities such as transportation, marketing, and equipment sales and maintenance, provided an additional 2,014 jobs. Direct and indirect employment during this period peaked in 1990 with totals of 3,543 and 2,570 jobs, respectively.

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Employment has dropped recently, primarily due to lower market conditions and the closure of the pulp mill in Ketchikan in 1997. With that closure, employment in this category has been reduced by approximately 520 jobs. In 2001, total wood products employment in Southeast Alaska was approximately 782 jobs (Forest Plan Final Supplemental EIS, 2003, page 3-246).

Table 3-1  
Forest Products Industry Employment in Southeast Alaska 1991 to 2000

Employment Type	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Logging	1,554	1,415	1,344	1,177	1,185	1,157	1,049	889	824	711
Saw Mill	604	538	447	515	301	230	184	284	303	280
Pulp Mill	911	910	859	533	516	524	318	96	63	2
<b>Total Direct Job Years</b>	<b>3,069</b>	<b>2,863</b>	<b>2,650</b>	<b>2,225</b>	<b>2,002</b>	<b>1,911</b>	<b>1,551</b>	<b>1,269</b>	<b>1,190</b>	<b>993</b>

Source: Forest Plan Final EIS, 1997; USDA Forest Service, 1998n, and AK Dept. of Labor 2000

#### Timber Supply and Market Demand

Determining market demand is a complex process. An explanation of the overall rationale for considering timber harvest in the Licking Creek project area, market demand for wood products, and how this sale fits into the overall timber program for the Tongass, is located in Appendix A of this document. More information can also be found in the Forest Plan Final EIS, Part 1 (pages 3-248 to 3-307) and the Forest Plan Final Supplemental EIS (2003; pages 3-236 to 3-441) to which this document is tiered.

The Tongass National Forest makes two determinations on volume to be offered. The first is a determination on volume to be offered for the current year (annual market demand). The annual market demand is analogous to assessing industry performance in the short-term. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. Timber inventory requirements are acknowledged and estimated in a related calculation. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year. The document, *Evaluating the Demand for Tongass Timber* (Morse, 1998), forms the basis for how these estimates were developed. The document, *Tongass National Forest Sale Procedures* (Morse, 2000), documents the process used to determine the current fiscal year offer. The Regional Office annually updates actual estimates for each year. This estimate is what the Tongass plans to offer for the current year of the 10 Year Timber Sale Schedule, pending sufficient funding to do so. Final procedures can be located in *Responding to the Market Demand for Tongass Timber* (Morse, 2000).

Based on the analysis procedure documented in the *Tongass Timber Sale Procedures, Fiscal Year 2002*, the Tongass National Forest offering that is required to meet timber supply objectives is 151 MMBF. The offer planned will be a combination of new, previously offered, and previously offered and reconfigured timber sales. Both standing timber and salvage will be components of the program. Offerings will consist of those targeted for Small Business qualified firms as well as a portion of the volume being made available for open market.

The second estimate that the Tongass National Forest makes regarding determinations on volume to be offered is the long-term. The basis for this estimate is the long-range timber market projections documented in *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes, 1997).

There are many variables that can increase the cost of timber sale offerings, and may carry significant economic risk for potential purchasers. High cost could be incurred as a result of road construction, helicopter logging, amount of timber volume and value of timber being removed. Market stumpage values must be sufficient to cover this cost and offer a profit for potential purchasers. The timber economics for the project have the potential to affect the timber supply to the forest products industry. It may also have an affect on employment in the local communities of Southeast Alaska.

Economic deferral (deferring a timber sale for economic reasons) is dependent on changing conditions that including log prices, the cost of accessing harvest units (roads), and the efficiency of harvest systems (including yarding and hauling costs).

In order to maintain a stable timber sale program, we need to provide a continuous flow of timber to the timber industry. The Forest Service has developed a timber sale program to respond to this need. The proposed Licking Creek Timber Sale is a necessary component of this program, and the sale is identified on the 10-year Timber Sale Plan.

## Environmental Consequences

### Direct and Indirect Effects

#### Projected Timber Employment and Income

The action alternatives would have direct and indirect impacts to the economies of the local communities (Table 3-2). We estimated the amount of employment and income likely to result from timber harvest by converting board feet to jobs and income, using Forest Plan multipliers developed for Southeast Alaska. The Forest Plan Final EIS estimated that 5.28 direct jobs are generated per million board feet. This value was based on the assumption that Alaska yellow cedar would be exported. Direct jobs are in logging, construction, marine transport, and sawmills. Table 3-2 displays direct logging-related employment and income. Alternative 1 would not generate timber-related jobs.

**Table 3-2**  
Logging-related Employment and Income for each Alternative

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Employment<sup>1</sup></b>						
Direct Job Years	0	28	63	89	85	29
<b>Total Income (Millions \$)<sup>2</sup></b>						
Direct Income	0	1.26	2.80	3.95	3.80	1.30

<sup>1</sup> Job year/harvest ratios are from the Forest Plan. Assumes export of yellow cedar.

<sup>2</sup> Woods products gross income estimates from the Forest Plan Final EIS, 1997, adjusted to 1998 dollars.

Source: Forest Plan 1997; D. Fletcher, NEAT, 2002; S. McCoy, NEAT, 2003

All alternatives have been appraised assuming the export of Alaska yellow cedar and local (Southeast Alaska) processing of other species (NEAT analysis). Currently, about 25 percent of Alaska yellow cedar, 50 percent of western red cedar, and 75 percent of Sitka spruce and western hemlock is processed in Southeast Alaska (1998-2002 data), with the remainder exported (Wilson 2003). Export prices and local processing costs fluctuate with changes in markets. NEAT analysis is a planning tool, and the estimates of potential sawmill employment (Table 3-2) are best used for a relative comparison between the alternatives.

#### Non-Timber Employment

Carroll Inlet, the main access to the Licking Creek project area, is not a destination for package tours at the present time, not offering the amenities of nearby Misty Fiords. Most recreational use in the project area is road-based hunting. The Licking Creek project would have a minimal



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effect on the recreational setting and recreational use of the area, and consequently on recreation-related employment in Ketchikan. (See further discussion in the Recreation section of this chapter.)

The anadromous fish habitat in the Licking Creek project area totals less than 1 mile, and the fisheries have low productivity. It is also not a destination for sport fishing. (See further discussion in the Watersheds and Fish Habitat section of this chapter.) Given this, the effects of the proposed project on fishing-based employment are expected to be negligible.

## Opportunities for Small Sales

The timber volume in Alternatives 3, 4 and 5 could be separated into more than one timber sale. Alternatives 2 and 6 would be offered as one sale, due to the small volume and the associated move-in costs of multiple sales. The Ketchikan-Misty Fiords Ranger District has an annual salvage and small sales program of approximately one million board feet.

## Payments to the State of Alaska

In previous years, 25 percent of the returns to the U.S. Treasury from revenue-producing Forest Service activities was returned to each State containing national forest lands and then distributed to counties (or, in Alaska, to Organized and Unorganized Boroughs) with national forest acreage within their boundaries. These were termed "25 percent fund payments" and were dedicated to schools and roads. More recently, in order to stabilize these payments in the face of declining Forest Service timber harvests and associated revenues, Congress enacted the Secure Rural Schools and Community Self-Determination Act of 2000. Under this Act, boroughs can elect to receive a "full payment amount," which is the average of the highest three payments made between 1986 and 1999. The Act makes this option available through fiscal year 2006.

Under the full payment approach, Forest Service payments to the State of Alaska during the 2001-2006 period would not be directly linked to annual revenues, but instead, would be based on the historic "high 3-year" average. Total revenues during the 2001-2006 period are expected to be considerably less than this "high 3" average. Therefore, the full payment approach is the likely option for affected boroughs, and the difference in revenues across the planning alternatives will have no effect on the payments these boroughs receive.

## Timber Financial Efficiency Analysis

One way to compare the effects of the different alternatives is to conduct a financial efficiency analysis. Financial efficiency analysis is a comparison of those costs and benefits that can be quantified in terms of actual dollars spent or received within the project area. When considering quantitative issues, financial efficiency analysis offers a consistent measure in dollars for comparison of alternatives. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and costs that are not easily quantifiable, such as recreation. This is not to imply that such values are not significant or important, but to recognize that non-market values are difficult to represent by appropriate dollar figures. Therefore, financial efficiency should not be viewed as a complete answer but as one tool that decision makers use to gain information about resources, alternatives, and trade-offs between costs and benefits.

Although individual timber harvest units may or may not be economical to harvest by themselves, the management of less-productive land, or land containing a high percentage of defective timber, will help to increase future timber yields. The harvest of units with higher returns will help compensate for those less economical.

A preliminary appraisal was conducted for the action alternatives (Table 3-3, Harvest Economic Efficiency Analysis). This analysis was run using the NEPA Economic Analysis Tool (NEAT), which is based on the Transaction Evidence Appraisal method. The analysis compares estimated costs and determines an estimate of net stumpage values for high and low market conditions. Alternative 1 is not displayed because there is no harvest associated with it.



Harvest volumes were estimated for sawlogs that would be harvested. Due to market conditions, utility logs are not required to be removed during harvest operations. These volumes are based on field stand exam data, and the estimates are expected to vary from actual cruise volumes.

The expected bid rate for the last 15 quarters was used to display each action alternative's ranking based on the alternative's estimated timber quantity, quality and logging efficiency. These market scenarios are used to display the cyclical nature of timber markets. They are not intended to display a final appraised stumpage value.

Before any National Forest System timber is sold, it is appraised to estimate the material's fair market value. When a sale is offered, it is offered competitively and the contract is normally awarded to the firm offering the highest bid. These requirements have been imposed to help ensure that the government is justly compensated for any timber it sells.

For the Licking Creek Timber Sale, stumpage values were calculated for the action alternatives by including estimated stump to truck, transportation, logging overhead and road construction costs. The stumpage values do not include bid premiums that could result from competitive bidding for the timber when sold.

**Table 3-3**  
Harvest Economic Efficiency Analysis - Alternatives 2, 3, 4, 5 and 6 Timber Sale Values and Costs to an Operator of Average Efficiency

Volume CCF	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Sitka Spruce	2,225	5,215	7,337	7,162	2,515
Hemlock	7,468	16,461	23,061	22,205	7,608
Western Red Cedar	232	403	652	513	827
Alaska Yellow Cedar	784	1,753	2,506	2,381	168
<b>Total CCF</b>	<b>10,709</b>	<b>23,832</b>	<b>33,556</b>	<b>32,261</b>	<b>11,118</b>
<b>(MMBF)</b>	<b>(5.4)</b>	<b>(11.9)</b>	<b>(16.8)</b>	<b>(16.1)</b>	<b>(5.6)</b>
<b>Logging Cost/ CCF</b>	\$169.52	\$153.94	\$130.64	\$162.78	\$89.76
<b>Expected Bid Value</b>	(\$362,139)	(\$366,886)	\$278,578	(\$753,807)	\$566,037
<b>Advertised Rate/CCF</b>	(\$33.82)	(\$15.39)	\$8.30	(\$23.37)	\$50.91

<sup>1</sup> ( ) indicates negative value. Negative bid values are not advertised; adjustments may be made to improve economics, see Opportunities to Improve Economics in text.)

Source: D. Fletcher, NEAT, 2002; S. McCoy, NEAT, 2003

## Financial Efficiency Summary

The financial efficiency analysis for Alternative 2 produced an expected sale value of (\$362,139) for the current market condition. The expected advertised net stumpage rate would be (\$33.82) per CCF. The predominant reason Alternative 2 has a deficit value is due to the high logging costs of \$169.52 per CCF associated with helicopter yarding coupled with the current low market condition. Almost 47 percent of the timber would be harvested by helicopter. Regardless of market scenario, the estimated harvest volume and logging costs remain constant. Management standards could be applied to this alternative to improve the economics (discussed below under Opportunities to Improve Economics).

The financial efficiency analysis for Alternative 3 produced an expected sale value of (\$366,886) for the current market condition. The expected advertised net stumpage rate would be (\$15.39) per CCF. The predominant reason Alternative 3 has a deficit value is due to the high logging costs of \$153.94 per CCF associated with helicopter yarding coupled with the current low market condition. Almost 44 percent of the timber would be harvested by helicopter. Regardless of the market scenario, the estimated harvest volume and logging costs

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remain constant. Management standards could be applied to this alternative to improve the economics (discussed below under Opportunities to Improve Economics).

The financial efficiency analysis for Alternative 4 produced an expected sale value of \$278,578 for the current market condition. The expected advertised net stumpage rate would be \$8.30 per CCF. The predominant reason Alternative 4 is not deficit is due to the low logging costs of \$130.64 per CCF. Only 18 percent of the timber would be harvested by helicopter. Regardless of market scenario, the estimated harvest volume and logging costs remain constant. Management standards could be applied to this alternative to improve the economics (discussed below under Opportunities to Improve Economics).

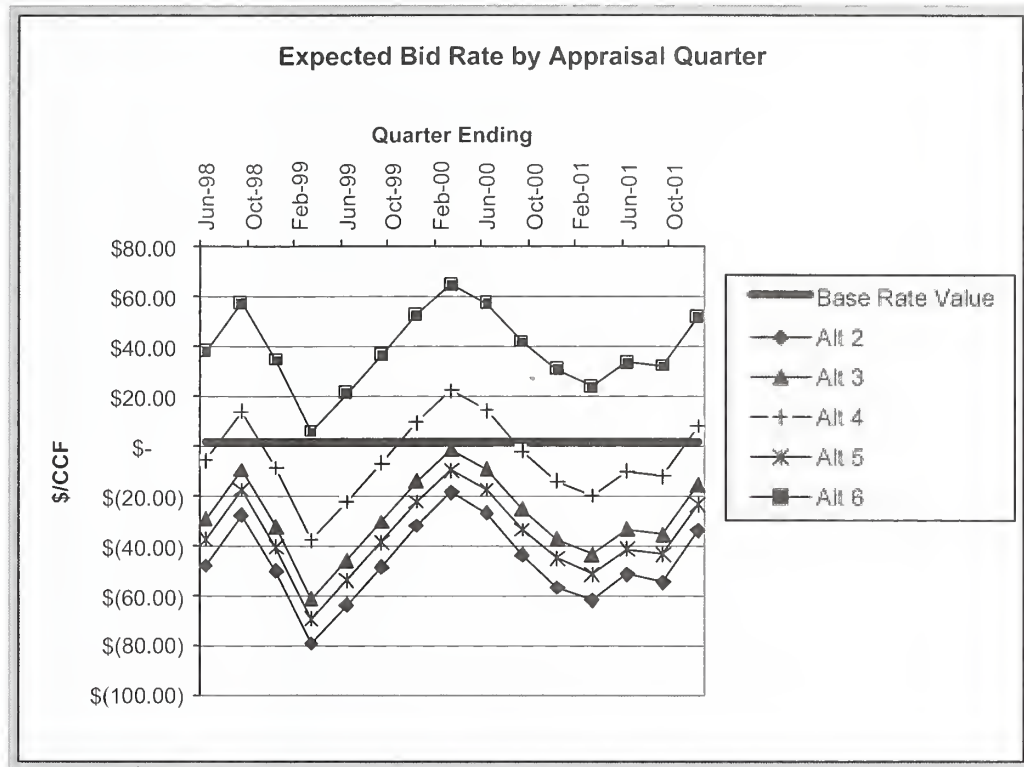
The financial efficiency analysis for Alternative 5 produced an expected sale value of (\$753,807) for the current market condition. The expected advertised net stumpage rate would be (\$23.37) per CCF. The predominant reason Alternative 5 has a deficit value is due to the high logging costs of \$162.78 per CCF associated with helicopter yarding coupled with the current low market condition. Seventy-two percent of the timber would be harvested by helicopter. Regardless of market scenario, the estimated harvest volume and logging costs remain constant. Management standards could be applied to this alternative to improve the economics (discussed below under Opportunities to Improve Economics).

The financial efficiency analysis for Alternative 6 produced an expected sale value of \$566,037 for the current market condition. The expected advertised net stumpage rate would be \$50.91 per CCF. The predominant reason Alternative 6 has a positive value is due to the low logging costs of \$89.76 per CCF associated with no new road construction costs and no helicopter yarding coupled with the current low market condition. In addition, harvest units are designed for harvesting only the first 500 feet of merchantable timber volume from existing roads. This alternative precludes utilization of optimal logging settings and ultimately increases logging costs for future entries since more road construction would be required to harvest less timber. Amortization costs for new roads would be higher for future entries resulting in future deficit sales. Regardless of market scenario, the estimated harvest volume and logging costs remain constant.

System types have a direct effect on the economics of harvesting timber. Helicopter yarding is proposed in portions of Alternatives 2, 3, 4 and 5. (See Table 3-37 in the Silviculture and Timber Management section in this chapter.) Of these alternatives, Alternative 4 has the lowest proportion of helicopter to cable/shovel yarding, which contributes to it being more economical on a per-unit harvest basis. Alternative 5 utilizes primarily helicopter yarding (72 percent), which contributes to it being the least economical of the action alternatives. Alternative 6, with no helicopter yarding, is the most economical in the short-term. However, timber remaining in the project area would be more difficult to access, increasing the logging costs of future sales.

The estimated harvest volumes, expected value, costs and net stumpage values projected in this document at this time are not definitive figures. These estimates are useful for comparing the alternatives but should not be used for determining actual sale volume, costs or values. Merchantable timber within units and any road right-of-way located on National Forest System lands would be cruised to determine the quantity, quality and value of timber for the contract under which that volume of timber is offered. The final sale appraisal would include current quarter selling values, current cost information and a normal profit and risk allowance to determine the minimum advertised stumpage value at the time of offering. It should be noted that base rates to cover cost of essential reforestation and a small return to the National Treasury would be the minimum rates advertised for sales. Competitive bidding determines the actual value.

Figure 3-1  
Expected Bid Rate by Appraisal Quarter



Source: D. Fletcher, 2002; S. McCoy, 2003

The above chart displays Alternatives 2, 3, 4, 5 and 6 with respect to the expected bid for the last 15 quarters beginning with June of 1998. The curve reflects the market conditions over the past 3 years. The bold black line in the middle of the chart depicts base rates, which are the minimal rates the Forest Service will accept for timber. Rates below this line are not expected to sell under market conditions. Alternative 4 is positive or above base rates for 5 of the last 15 quarters. Alternatives 2, 3, and 5 are not positive during any of the last 15 quarters. Alternative 6 is positive or above base rates for all 15 quarters.

### Opportunities to Improve Economics

Options exist for improving the economics of each alternative, were it to appraise deficit at the time of offer. These options include:

- Partition the harvest units into two or more timber sale offerings.
- Adjust the road package—drop isolated units accessed with long road segments or expensive road reconstruction or bridge installation.
- Apply diameter limits of harvest. The Optional Removal contract clause (Forest Service Handbook 2409.22 Chapter 630) allows sale purchasers to leave utility logs on the site. These logs still have to be purchased as part of the timber sale, but the purchaser no longer has to remove them, saving on logging and haul costs. All alternatives have been appraised with a required removal to a 6-inch diameter top. The utilization standard could be adjusted to an 8-inch diameter top. Another option is to identify more leave trees in helicopter units to reduce logging costs per CCF for the minimum amount of volume to increase value to base rates. Application of these



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measures would reduce the volume harvested, resulting in an over-estimate of potential employment.

- Drop isolated helicopter units (or all helicopter units). Due to low market conditions in the previous six economic quarters prior to 4<sup>th</sup> Quarter 2001 (NEPA Economic Analysis Tool) and the high cost of helicopter logging, there is the option of delaying harvest of helicopter units until a later date for market conditions to improve, to help improve timber sale profitability.
- Expand export to include other species. All alternatives have been appraised with export of Alaska yellow cedar and local (Southeast Alaska) processing of other species (NEAT analysis). Currently there is a market for small-diameter Western red cedar for processing in the lower 48 contiguous states; this volume is currently not processed in Southeast Alaska. The lack of a local market for chips has also resulted in an increase in applications to export low-grade round Sitka spruce and western hemlock logs. Exports of species other than Alaska yellow cedar would reduce the volume for domestic processing, resulting in an over-estimate of potential local sawmill employment. Local processing of Alaska yellow cedar would have the opposite effect.

The potential for applying these options to each action alternative is discussed below.

The advertised rate for Alternative 2 would still be negative (as estimated using NEAT analysis) with application of the utilization standard to an 8-inch diameter top and export of western red cedar. Additional options for Alternative 2 would be to drop helicopter units and Unit 63, which requires a long segment of road reconstruction and replacement of one bridge.

The advertised rate for Alternative 3 would still be negative (as estimated using NEAT analysis) with application of the utilization standard to an 8-inch diameter top and export of western red cedar. Additional options to improve the economics of Alternative 3 would be to partition the sale, drop isolated units to reduce road costs, and drop helicopter units.

The reason Alternative 4 may appraise positive is due to the lower amount of logging costs per CCF associated with helicopter yarding, and more cable yarding acres to average out the higher helicopter costs. This alternative also has fewer miles of road reconstruction than Alternatives 2, 3 and 5. If Alternative 4 were to appraise deficit at the time of offer, options to improve the economics would be to apply the utilization standard to an 8-inch diameter top, partition the sale, drop isolated units to reduce road costs, and drop helicopter units.

The advertised rate for Alternative 5 would still be negative (as estimated using NEAT analysis) with application of the utilization standard to an 8-inch diameter top and export of western red cedar, primarily due to the high percentage of helicopter harvest. Options to improve the economics would be to partition the sale, drop isolated units to reduce road reconstruction costs, and drop helicopter units.

It is very unlikely that Alternative 6 would appraise deficit, as it is designed to maximize short-term economic gain with no expensive logging costs associated with helicopter yarding. Timber remaining in the project area after the sale would be more difficult to access, increasing the logging costs of future sales.

#### **Economic Analysis of Alternatives without Helicopter Units**

The expected bid values for Alternatives 2-5 increase when helicopter yarding is removed from consideration. When only cable units are analyzed in NEAT for economic costs related to timber harvesting, the expected bid value per CCF ranks the alternatives 6, 5, 4, 3, and 2, with Alternative 6 being the highest and Alternative 2 the lowest.

The cable logging costs per CCF are relatively constant for all alternatives. These are fixed costs and the total logging cost changes proportionally with the amount of timber harvested. Road costs reflect the amount of road construction and reconstruction proposed. With the



removal of helicopter yarding, Alternative 2 still has a negative expected bid value per CCF in all quarters, due to the high logging and road costs per CCF, while the expected bid value per CCF is positive in most (or all) quarters for the other action alternatives.

Considering only cable yarded units, the expected sale values are \$634,538 for 13.7 MMBF of timber for Alternative 4, \$566,037 for 5.6 MMBF for Alternative 6, \$367,025 for 4.5 MMBF for Alternative 5, \$245,476 for 6.6 MMBF for Alternative 3, and negative \$108,202 for 2.8 MMBF for Alternative 2. Alternative 4 would harvest the most volume of timber, and would provide more job opportunities and more revenue for timber industry-dependent employment than the other four action alternatives.

## **Effects on Tongass Timber Supply**

The Licking Creek Timber Sale would have short-term and long-term effects to supply and demand of wood. There is the opportunity with this project to provide one or more timber sales within a 2-year period. The proposed roads would provide opportunities for future entries.

## **Public Investment Analysis**

Public investment analysis of each alternative compares the value of the timber with the cost of preparing the timber sale. The average Region 10 budget allocation costs and management expenses are subtracted from net stumpage revenues to determine net value. The costs and management expenses include environmental analysis, sale preparation, sale administration and engineering support. Forest Service cost per hundred cubic feet (CCF) is based on the Region 10 average budget allocation of \$20.50/CCF for analysis, \$11.50/CCF for sale preparation, \$4.50/CCF for sale administration and \$14.00/CCF for engineering support.

Environmental analysis costs include field inventory and the analysis of data, public involvement, and the preparation of a document that satisfies the requirements of the National Environmental Policy Act. The timeframe is about 2 years and involves many resource specialists. Although it is based on timber volume, the cost fluctuates more with the amount of area to be examined and the accessibility of that area. The Licking Creek project area is accessible by road and located on Revillagigedo Island. A Forest Service field camp is located near the project area to house District employees. Working from a field camp greatly reduces the cost of transportation to the area compared to other project areas. Most other areas are accessible only by helicopter, floatplane, or boat with no overnight facilities. The environmental analysis cost is constant and applies to all alternatives, including the No-action Alternative.

Unit layout and cruising costs increase significantly when partial harvest is prescribed, as compared to clearcutting. The Alternatives-to-Clearcutting Research Study on Kupreanof Island required about eight times more person-days to prepare a unit that involved marking individual trees throughout the unit compared to a clearcut unit. Designation of 2-acre patches took about four times longer than a clearcut. Accessibility to the units is another major cost factor. Helicopter access and steeper terrain increase sale preparation costs, as compared to areas with existing road access.

Using these cost factors, Alternatives 2 and 6 would be the least costly to prepare because of the easy access from existing roads and the low volume associated with these alternatives. Alternatives 3 and 5 would be the next least costly to prepare. Although Alternative 5 has more volume than Alternative 3, no additional roads would be constructed; as a result, engineering support would be less. Alternative 4 would be most costly to prepare because of the amount of volume and road construction associated with the alternative.

Sale administration costs are higher when helicopter logging is involved because of the increased cost of accessing the timber harvest for administration. Scattered and smaller harvest areas are more costly to visit. Because of the higher sale administration costs for helicopter yarding, Alternatives 3 and 5 would have higher costs than the other action alternatives. Alternative 4 would be the next most costly. Alternative 2 would be the least costly due to the small amount of helicopter volume. Alternative 6 does not utilize helicopter yarding.

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## Cumulative Effects

### Alternative 1

No timber would be harvested for this project from the project area. Other timber sales that have been cleared and/or sold in the project area, such as Madder Timber Sale and Mop Point/91 Knot Timber sale, will still be harvested. In order to meet the estimated demand for timber, more timber may need to be harvested elsewhere on the Tongass National Forest. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future.

### Alternatives 2, 3, 4, 5, and 6

A stable timber economy depends on an even flow of timber that operators can depend on in order to make investments in machinery and to employ qualified workers. Timber from the Licking Creek Timber Sale would be one part of the timber supply available for public consumption. A stable timber supply in Southeast Alaska depends on the success of many timber sales across the Tongass National Forest. The amount of timber harvest that occurs also affects the availability of timber in the foreseeable future and contributes to the long-term timber supply. Timber from the project area has been contributing to the timber industry of Southeast Alaska since 1954, particularly since the early 1970s when roads were first built into the area. Since 1954, approximately 2,954 acres of timber have been harvested from the project area. In addition to providing timber access, the roads within the project area have been used to access second-growth stands for thinning within the current project area boundary. Other timber sales in the project area include Madder Timber Sale (seven units totaling 249 acres with 16,982 CCF (8.5 MMBF) occur in the project area) and Mop Pt./91 Knot Timber Sale (one unit totaling 9 acres with 544 CCF, approximately 272 MBF). The Madder and Mop Pt./91 Knot Timber Sales have signed decisions and are scheduled to be sold. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future.

## Issue 2: Wildlife

### Issue Statement: Timber harvest may reduce wildlife habitat, which may affect deer and other wildlife populations.

The following analysis is tiered to the Wildlife section of the Tongass Land Management Plan Final Environmental Impact Statement (USDA Forest Service, 1997). Applicable direction is included in the 1997 Forest Plan, Chapters 3 and 4 and Appendix K, and the 1998 Tongass Land and Resource Management Plan Implementation Policy Clarification. Under the Forest Plan, old-growth habitat conservation is the core of the wildlife management strategy. Effects on old growth are discussed under Biodiversity and Old Growth, Chapter 3, of this EIS. Effects on Threatened, Endangered and Sensitive Species, including the northern goshawk, are presented in that respective section in this chapter. Effects on other wildlife species (called Management Indicator Species) are discussed here. Additional information is available in the unit and road cards (Appendix B of the Draft EIS), and in the Wildlife resource report, located in the Licking Creek project planning record.

#### Wildlife Habitats

Alaska wildlife species are valuable for ecological, subsistence, aesthetic, economic, and recreational reasons. Over 350 species of birds, mammals, amphibians, and reptiles occur within the Tongass National Forest (Forest Plan Final EIS). Many of these can be found within the Licking Creek project area. They occupy a diverse range of habitat and are variably adapted to climatic extremes, changes to habitat, predation, and hunting pressure.

Wildlife species depend on a variety of forest structures to meet their habitat needs. Although each action alternative proposes to harvest forested wildlife habitat, Forest Plan Standards and Guidelines protect some key habitats. These include old-growth habitat within Old-growth Reserves (OGRs), riparian habitats on all Class I, II and III streams, all beach and estuary fringe habitats, high-value American marten (*Martes americana*) habitat, and other areas unsuitable for timber harvest.

Currently, about 48 percent of the project area is in an undeveloped condition. Productive old growth (POG), old-growth stands at low elevations (below 1,500 feet), and old-growth stands with coarse canopy structure are important habitats for wildlife species in Southeast Alaska (Forest Plan Final EIS). Productive old growth has at least 8 MBF (thousand board feet) of timber volume per acre. Old-growth stands with a coarse canopy provide a high level of snow interception and are especially beneficial during the winter (Caouette, 2000). These old growth habitats are specifically discussed in the Biodiversity and Old Growth section in this chapter.

Wildlife Analysis Areas (WAAs) are used by Alaska Department of Fish and Game (ADF&G) for data collection purposes and by the Forest Service for wildlife analysis purposes. The Licking Creek project area occurs within WAA 406 and Value Comparison Unit (VCU) 7460 (see Figure 3-6 in the Biodiversity and Old Growth section in this chapter).

#### Management Indicator Species

Management Indicator Species (MIS) are those wildlife species whose responses to land management activities are thought to reflect the likely responses of other species with similar habitat requirements. Under the MIS concept, the responses to management activities of a relatively few species are studied and monitored, in order to predict the impacts to entire assemblages of species and associated habitats. They are also used to help establish management goals for game species and other species of public interest. Sitka black-tailed deer, Alexander Archipelago wolf, and American marten were selected as MIS species for this

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analysis because they are most likely to be significantly impacted by timber harvest activities in the Licking Creek project area.

#### Management Indicator Species

#### Basis for Selection

Alexander Archipelago wolf

Population concerns, furbearer and game species

Sitka black-tailed deer

Represents range of forested habitat and important subsistence and game species

American marten

Represents high-volume old-growth forest

The following species are identified as Tongass National Forest MIS, but were not selected as Licking Creek project MIS. The rationale is summarized below, and further discussed in the Wildlife resource report (in the project planning record).

#### Management Indicator Species

#### Basis for Non-selection

river otter, Vancouver Canada goose,  
black bear, bald eagle

Primary habitat protected by Forest Plan Standards & Guidelines. No harvest of these habitats proposed in the Licking Creek project area.

hairy woodpecker, brown creeper, red  
squirrel, red-breasted sapsucker

Habitat protected through Old-growth Reserves, under Forest Plan Standards & Guidelines for high-value marten and cavity nesting habitats, and non-harvest areas.

mountain goat

Incidental use of project area

brown bear

Does not normally occur in project area

### Wildlife Habitat Capability Models

Interagency wildlife models were used as a planning tool to calculate habitat capability for deer, wolf, and marten within the project area. The models provide relative values that are used to compare habitats and potential impacts among timber harvest alternatives.

An interagency model (Suring et al. 1992), developed to evaluate potential winter habitat capability (carrying capacity) for deer, was updated for the 1997 Forest Plan revision. The model calculates habitat suitability indices (HSIs), based on timber volume strata (high, medium, low - see Volume Classification and Table 3-32 in the Silviculture and Timber Management section in this chapter for a description), aspect, elevation, and typical snowfall. HSI values range from 0.0 to 1.3. An HSI score of 1.0 is multiplied by 100 deer per square mile to estimate the theoretical number of deer that the habitat may support. (These results do not represent actual numbers of deer and are used for comparison purposes only.) The number of deer per square mile and the amount of land in the top-scoring habitat are then compared at appropriate scales of analysis (usually project area, VCU, and WAA), and compared to recommended minimums that account for predation by wolves and bears and human harvest. (These are discussed in the Alexander Archipelago wolf section under Affected Environment.) Private lands are given a habitat value of zero in the model for analysis purposes, and consequently any management actions on those lands have no negative effects on the model results.

Another model (Suring et al. 1992) was developed to evaluate marten habitat capability and to estimate potential impacts of timber harvest. The model calculates HSI based on timber volume strata (high, medium, low), elevation, and typical snowfall. HSI values range from 0.0 to 1.0, and are multiplied by 2.71 marten per square mile to estimate the number of marten that the area may support. Private lands are given a habitat value of zero in the model for analysis



purposes, and consequently any management actions on those lands have no negative effects on the model results.

The terms “habitat capability” and “populations” are not synonymous. Habitat capability is the estimated number of animals the habitat can support through critical times of the year. Population size is the estimated number of animals actually present at a specific time. Populations can change over time for reasons other than changes in habitat (such as disease, predation, hunting harvest, or severe winter mortality), so that actual population sizes may vary considerably from those predicted by the model. Consequently, the model is best used to compare the potential effects of proposed management on habitat for these species, and the trends in population size we could expect to occur from these changes.

## Affected Environment

### Sitka Black-tailed Deer

Sitka black-tailed deer was chosen as a MIS because it is an important game and subsistence species and because it is associated with old-growth forests. Sitka black-tailed deer receive the highest subsistence and sport hunting use of all terrestrial species in Southeast Alaska. Research conducted in Southeast Alaska indicates that low-elevation, high-volume productive old-growth habitats with southern aspects and in low snowfall areas are particularly important to deer, especially during severe winters (Schoen et al. 1985, Hanley and Rose 1987, Yeo and Peek 1992, Forest Plan Final EIS). These mature old-growth stands intercept snow, provide thermal cover, and support the largest biomass of herb and shrub forage for deer (Alaback 1982).

Using the deer habitat model, we estimated the current habitat capability of the project area to be 67 percent of historic levels (Table 3-5). (Historic levels are defined as conditions that existed prior to initiation of timber harvest in 1954.) For WAA 406, existing capability is 79 percent of historic levels.

Hunter harvest is tracked by ADF&G at the WAA scale. A deer population at carrying capacity should be able to support an annual hunter harvest of approximately 10 percent that is sustainable, and ensure that a reasonably high percentage of hunters are successful. The number of successful hunters can be expected to decline in areas where harvest represents 10 to 20 percent of habitat capability. If harvest exceeds 20 percent of habitat capability, harvest of deer by hunters may be directly or indirectly restricted (Forest Plan, Final EIS). Hunters harvested an estimated average of 94 deer annually from WAA 406 (ADF&G, deer harvest data) during 1996 to 2001. This is approximately 3 percent of the deer habitat capability for the WAA during this period.

### Alexander Archipelago Wolf

The Alexander Archipelago wolf is a subspecies of the gray wolf. In Southeast Alaska, they inhabit the mainland and most large islands south of Frederick Sound. Person et. al. (1996) estimated the population at about 900 individuals. Approximately 200 to 250 are harvested annually in Southeast Alaska (Kirchhoff 1991, D. Person), with the majority taken along the shoreline from boats (Person et. al. 1996). Between 1995 and 1999, 18 wolves (averaging 3.6 per year) were legally harvested from WAA 406.

Sitka black-tailed deer are the principal prey of Alexander Archipelago wolves, and long-term viability of wolves is dependent on long-term deer habitat capability (Forest Plan Final EIS, Appendix N). Three key issues influence wolf populations in Southeast Alaska: 1) the loss of long-term carrying capacity for deer, primarily from timber harvest, 2) higher wolf mortality associated with increased human access from roads, and 3) continued high levels of wolf harvest by humans (Person et al. 1996). Similarly, the Forest Plan identified the maintenance of adequate deer habitat capability and the control of road density and human access as key factors important for maintaining viable, well-distributed wolf populations (Forest Plan Final EIS). Both sources agreed that maintaining long-term deer habitat capability is the most important factor in maintaining wolf populations.

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Forest Plan Standards and Guidelines state that 13 deer per square mile are needed to support both wolves and hunter demand. The Forest Plan Implementation Policy Clarification (1998) states that an average habitat capability of 17 deer per square mile is needed over the long term to maintain an actual density of 13 deer per square mile. Person et al. (1996) recommended that, in areas where wolves prey primarily on deer, adequate habitat to support 18 deer per square mile should be maintained to provide for current levels of deer harvest by both wolves and hunters. The Annual Monitoring and Evaluation Report for Fiscal Year 2000 (Monitoring Report FY 2000) adopted 18 deer per square mile as the latest recommended minimum carrying capacity to strive to maintain. A density of 100 deer per square mile was used in the model and no predation factor was applied, as described in the Monitoring Report for FY 2000. This is a recommended guideline, not an absolute management threshold (Forest Plan, page 3-405).

Prior to any timber harvest, the project area had an estimated habitat capability of 49 deer per square mile (Table 3-4). Current habitat capability at all scales (project area, VCU, and WAA) is estimated to exceed the recommended capacity of 18 deer per square mile. These values represent the density of deer during the winter (below 1,500 feet in elevation), because winter is considered the limiting factor in population size for deer. This was also the approach used in the Forest Plan Final EIS. The values differ from the Licking Creek Draft EIS, because the entire land base was used to calculate the density instead of only that area below 1,500 feet in elevation.

Table 3-4  
Pre-Harvest and Existing Total Deer Density in the Licking Creek Project Area<sup>1</sup>

	Deer Density per Square Mile below 1,500 feet	
	Project Area	WAA 406
Year 1954	49	34
Existing <sup>2</sup>	33	27

<sup>1</sup> Density of deer was based on estimated numbers of deer, as calculated by the Interagency Deer Mode

<sup>2</sup> Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as already cut in calculating these values.

Source: J. Llanos, 2001

#### Effects of Prior Road Construction

Roads can also impact populations of deer and wolves. Roads may increase both legal harvest and illegal poaching of wildlife (Forest Plan Final EIS). Person et al. (1996) reported that wolves experienced higher mortality from hunting and trapping in WAAs with higher road densities, and that harvest of wolves by humans increased sharply in WAAs where road density exceeded 0.5 miles per square mile. This relationship is stronger where road systems are highly connected to other road systems or to human population centers (Person, unpublished data).

The Forest Plan directs that reducing open road density to 0.7 to 1.0 mile per square mile may be necessary in areas where road access contributes significantly to wolf mortality concerns. Currently, road density is 0.3 mile per square mile in WAA 406 (see Table 3-7). Alternative 4, which proposes the most road construction, would increase the open road density during project implementation to 0.4 mile/square mile. This is still below the recommended level of 0.7 to 1.0 mile per square mile. New roads would be closed after the project is completed and silvicultural certification has been accomplished. Between 1995 and 1999, 18 wolves were legally harvested from WAA 406.

No wolf dens have been identified within the project area. Should one be identified, a 1,200-foot buffer of no timber harvest, and a 600-foot buffer of no road construction, would be implemented around the den, as required by the Forest Plan Standards and Guidelines.

## American Marten

American marten was selected as a MIS to represent old-growth associated species and because it is an important furbearer. American marten historically occurred on the mainland of Southeast Alaska and on Kuiu, Kupreanof, and Revillagigedo Islands. Between 1930 and 1950, marten were transplanted to Baranof, Chichagof, and Prince of Wales Islands. Like deer, marten are dependent on high-quality winter habitat, which consists of low-elevation, high-volume old-growth forest, especially in beach fringe and riparian areas. These habitats intercept snow, provide cover and denning sites, and provide habitat for prey species.

Using the marten habitat model, we estimate that the current habitat capability within the project area is 59 percent of the habitat capability that existed prior to any timber harvest in the 1950s (Forest Plan Final EIS). See Table 3-8.

## Other Wildlife Species

The Forest Plan requires an evaluation of the existence of rare or endemic terrestrial mammals that may represent unique populations with restricted ranges. No surveys were conducted specifically for this project. However, researchers from the University of Alaska Museum, Fairbanks, conducted numerous surveys in the Ketchikan-Misty Fjords area between 1993 and 1999 (McDonald and Cook 1999). Although none were trapped, there is potential for the occurrence of northern flying squirrels (*Glaucomys sabrinus*) and ermine (*Mustela erminea*) in the project area (A. Runck). Northern flying squirrels are discussed below. Viability discussions in the Forest Plan rated vulnerability of ermine habitat as low due to a limited association with old growth (Forest Plan EIS); therefore, the proposed project is not anticipated to have a substantial effect and ermine are not discussed further. Mink (*Mustela vison*) have been observed in the Licking Creek project area. Primary habitat for this species is protected under Beach and Estuary Fringe and Riparian habitat designations. Effects on these species are expected to be minor. Band-tailed pigeons, considered rare in Southeast Alaska, have been sighted in the project area; they are discussed below.

### Northern Flying Squirrel

This species is considered an old-growth associate and was identified as a viability concern in the Forest Plan. Flying squirrels are nocturnal and therefore, may be more abundant than casual surveys indicate. Old-growth Reserves are considered to best meet overall habitat needs and should support well-distributed populations capable of interacting across landscapes (Forest Plan). Beach, estuary, and riparian management areas provide valuable habitat and dispersal corridors to maintain connectivity and allow interaction between populations.

### Band-tailed Pigeon

This species was identified as a species of special interest because Southeast Alaska is the northern periphery of its range. Few records exist for the Ketchikan area. During field surveys in 2001, a flock was observed near the coast, west of the main road between the mouths of Calamity and Marble Creeks. They were observed some years earlier during field surveys for the Sea Level Timber Sale EIS, between Calamity Creek and Licking Creek. Additional surveys were completed in 2002 to try to determine the extent of band-tailed pigeons in the areas around Licking Creek Unit 11, but no sightings were recorded. Surveys are planned in 2003 for the area between Calamity and Marble Creeks where the birds were seen. Recent Pacific coastal population declines are believed to be related to widespread habitat alteration and specifically the replacement of old-growth forest by even-age monocultures of fast-growing conifers (TNC Element Stewardship Abstract – Band-tailed pigeon, [www.conserveonline.org](http://www.conserveonline.org)).

### Marbled Murrelets

Marbled murrelets were identified as a species of concern in the Forest Plan. Although populations are relatively abundant in Alaska, the species is listed as threatened by the U.S. Fish and Wildlife Service (USFWS) in California, Oregon, and Washington and as threatened by the Province of British Columbia. Marbled murrelets prefer low-elevation forest near the coast (DeGange 1996). In Southeast Alaska, murrelet detections were greater in high-volume old growth (DeGange 1996). OGRs, beach/estuary fringe, and riparian buffers form the core of



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conservation habitat within the project area. Larger blocks of suitable habitat are also available within non-development LUDs and the adjacent Misty Fiords National Monument.

Marbled murrelet surveys are only required in project areas where the Interdisciplinary Team or a line officer determines that murrelets are a major issue (Inventory Protocols for Wildlife and Sensitive Plants for Timber Sale Planning and Assessments on the Ketchikan Area of the Tongass National Forest, 1997). Field personnel are asked to report sightings to a biologist for follow-up. Surveys were conducted for murrelets during the Sea Level Timber Sale EIS and although no nests were found, most of the area was identified as potential nesting habitat. A nest was reported in the project area; surveys are being conducted, and murrelet activity has been confirmed.

## Herons and Raptors

Great blue herons use intertidal mud flats for foraging. Raptors use a variety of habitats, depending on the species. Some owls are cavity nesters while red-tailed hawks prefer edge habitat for nesting. Field personnel are trained in the recognition of these species and are encouraged to report all sightings to a biologist for follow-up as soon as practical. No heron or raptor nests were located within the Licking Creek project area. If one is located, it will receive a forested 600-foot windfirm buffer, as required by the Forest Plan Standards and Guidelines.

## Environmental Consequences

### Direct and Indirect Effects on Deer

We used the deer habitat model to estimate the potential effects of the action alternatives on deer habitat capability. The model assumes that all timber harvest is accomplished using traditional even-aged (clearcut) silvicultural prescriptions, and that the habitat capability declines after harvest. Although clearcutting may result in a short-term increase of available forage for deer, the forage has reduced nutritive value (lower levels of digestible proteins) and, because of snow accumulation in openings during winter and early spring, is often unavailable to deer at the most critical time of year (Forest Plan Final EIS). Additionally, the regenerating tree canopy closes 25-35 years after harvest, and most forage plants for deer disappear. This "stem exclusion" stage can persist for over 100 years (Forest Plan Final EIS, Appendix N). Although precommercial thinning can delay canopy closure by 10-15 years, the benefits of thinning on forage appear to be temporary (Schoen et al. 1988, Person et al. 1996), and only a portion of harvested acres have been thinned or will be thinned.

In this project, less than 5 percent of the harvest acres would be harvested under uneven-aged prescriptions (see Silviculture and Timber Management, Table 3-36). Although the effects of these alternative harvest methods on deer habitat capability are currently unknown, they may have less impact than clearcutting, and the model may overestimate the reductions in habitat capability on these acres after timber harvest.

Using the deer habitat model, we estimate that the proposed timber harvest in the action alternatives would reduce existing habitat capability in the project area by 2 to 9 percent and in WAA 406 by 1 percent or less (Table 3-5). Alternative 2 would have the least impact on habitat capability and Alternative 4 the greatest. Currently, the reduction in the project area since 1954 is approximately 33 percent. The action alternatives (Alternatives 2 through 6) range from 34 percent to 39 percent overall reduction since 1954 (see Table 2-2 in Chapter 2).



**Table 3-5**  
Effects of Proposed Timber Harvest on Deer Habitat Capability<sup>1</sup>

	Project Area		WAA 406 <sup>2</sup>	
	% Year 1954	% Existing	% Year 1954	% Existing
Year 1954	100	---	100	---
Existing (2001)	67	100	79	100
Alternative 1	67	100	77	98
Alternative 2	66	98	77	97
Alternative 3	64	96	77	97
Alternative 4	61	91	77	97
Alternative 5	64	95	77	97
Alternative 6	65	97	77	97

<sup>1</sup>Deer capability numbers were based on modeled Habitat Suitability Indices (HSIs); HSI = 1.0 represents 100 deer per square mile. Numbers are for comparison purposes only and do not reflect actual deer population.

<sup>2</sup>Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as already cut in calculating these values.

Source: C. Tighe, 2003

The average estimated harvest of deer by hunters, as described in the Affected Environment section, is currently less than 3 percent of the estimated habitat capability of the WAA. Timber harvest units analyzed in the Sea Level Timber Sale EIS were considered as already cut (clearcut stage) in the calculated values. At this level, there should be a high number of successful hunters. Access to WAA 406 and the project area is via boat or plane, and hunting is done on foot or four-wheeler. Timber harvest activities would contribute a few additional hunters from logging camps into adjacent areas during the active phase of the sale. New road construction may somewhat increase the annual harvest of deer by expanding the existing access, but would not bring more hunters into the area. (See additional discussion in the Subsistence section of this chapter.) New roads would be closed to motorized vehicles after project completion.

### Habitat Suitability Index Scores on the Project Area

A habitat suitability index (HSI) score of 1.0 is considered capable of supporting 100 deer per square mile. This is used as a reference point for ranking the habitat capability (for comparison only) and does not represent actual numbers of deer. Of the land base in the project area assigned some value to deer (59 percent of the project area), approximately 25 percent had HSI scores from 0.5 to 1.0 (Figure 3-2). Alternative 2 would have the least impact on this highest-quality habitat (2-percent reduction in acres and habitat capability following harvest) while Alternative 4 would have the greatest impact (12 percent reduction in acres and a 9 percent reduction in habitat capability following harvest). Alternative 5, would also harvest approximately 12 percent of the highest-quality acres, but would only reduce the overall capacity by 5 percent. Alternatives 3 and 6 would harvest about 5 percent and 4 percent of the highest-quality habitat, and yield a 4 percent and 3 percent reduction in the overall habitat capability, respectively.

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Figure 3-2  
Licking Creek Project Area Deer Habitat Capability (Habitat Suitability Index)



/f/tiles/office/gis/licking\_creek/gis\_req/for\_todd/plot\_hyal.aml

Source: J. Llanos, GIS, 2002

## Direct and Indirect Effects on Alexander Archipelago Wolf

For the purposes of project area wolf habitat analysis, habitat capabilities calculated from the deer model and expressed as theoretical deer per square mile are discussed here.

All alternatives would maintain habitat capability, at both the project level and WAA level, above a density of 18 deer per square mile, as recommended in the Monitoring Report for FY 2000 (Table 3-6). Alternative 2 would have the least impact on habitat capability, showing about a 2 percent reduction from the existing habitat capability on the project area (Table 3-5). Alternatives 6, 3, and 5 would reduce the existing habitat capability by approximately 3, 4, and 5 percent, respectively. Alternative 4 would have the most impact (about 9 percent), but would still meet the recommended level of 18 deer per square mile. At the WAA level, all alternatives would be approximately the same as the No Action Alternative. These values represent deer during the winter (below 1,500 feet in elevation), because winter is considered the limiting factor in population size for deer. This was also the approach used in the Forest Plan Final EIS. The values differ from the Draft EIS, because in the Draft EIS the entire land base was used to calculate the density instead of only that area below 1,500 feet in elevation.

Table 3-6  
Effects of Proposed Timber Harvest on Deer Density in Licking Creek Project Area and Vicinity

	Approximate Deer Density <sup>2</sup> per Square Mile below 1,500 feet	
	Project Area	WAA 406
Year 1954	49 (100%)	34 (100%)
Existing	33 (67% of 1954)	27 (79% of 1954)
Alternative 1	33 (67% of 1954)	26 (77% of 1954)
Alternative 2	32 (66% of 1954)	26 (77% of 1954)
Alternative 3	31 (64% of 1954)	26 (77% of 1954)
Alternative 4	30 (61% of 1954)	26 (77% of 1954)
Alternative 5	31 (64% of 1954)	26 (77% of 1954)
Alternative 6	32 (65% of 1954)	26 (77% of 1954)

<sup>1</sup>Deer numbers were based on modeled Habitat Suitability Indices (HSIs); HSI = 1.0 represented 100 deer per square mile. Capability was divided by the land area below 1,500 feet elevation to estimate density.

<sup>2</sup>These densities are presented for comparison purposes only; they **do not** reflect actual, known numbers of deer.

Source: J. Llanos, 2002, 2003

These modeled results are based on the assumption that all acres would be subject to clearcut harvest. Some of the acres (less than 5 percent) would be harvested using uneven-aged harvest prescriptions. Consequently, it may be possible for the impacts to be somewhat less than is predicted.

### Road Impacts on Wolves

Many studies show that wolf abundance may be inversely correlated with open road density (Person, D.K., M. Kirchhoff, V. Van Ballenberghe, G.C. Iverson, and E. Grossman, 1996). Forest Plan Standards and Guidelines direct that an open road density of 0.7 to 1.0 may be needed to reduce mortality to acceptable levels (Forest Plan).

WAA 406 was selected as the appropriate landscape scale for road density thresholds for the Licking Creek analysis. The current road density in WAA 406 is 0.3 miles per square mile (Table 3-7), which is below the Forest Plan guidance of 0.7 to 1.0 mile per square mile. All new roads would be closed to motorized vehicles within 3 years after harvest and silvicultural activities are completed. We consulted with Alaska Dept. of Fish and Game regarding road density and mortality concerns for WAA 406, and they confirmed that since the road system is not connected to a community and the road density is not high, any increase in hunting and

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trapping as a result of this project should not jeopardize the sustainability of the wolf population in the area (Person, personal communication 2003).

**Table 3-7**  
Open Road Miles (Existing, Scheduled and Proposed) and Open Road Density for WAA 406 by Alternative

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Miles of existing open road <sup>3</sup>	66.0	66.0	66.0	66.0	66.0	66.0
Miles of proposed road construction (Sea Level Timber Sale EIS)	10.2	10.2	10.2	10.2	10.2	10.2
Miles of proposed road construction for Licking Creek project area <sup>2</sup>	0	1.5	2.2	5.5	0	0
Open road density during project implementation <sup>1</sup>	0.4	0.4	0.4	0.4	0.4	0.4
Existing and post-harvest open road density	0.3	0.3	0.3	0.3	0.3	0.3

<sup>1</sup> Road densities calculated as linear miles of road per square mile of land.

<sup>2</sup> This includes both classified and temporary road.

<sup>3</sup> Existing open road are currently drivable.

Source: J. Llanos, 2002, 2003

Since access to the project area is via boat or plane, new road construction would not be expected to increase the number of hunters within the project area. There may be a few additional hunters from logging camps during active timber harvest. New roads would expand access into more remote areas, and may increase the harvest of wolves for a few years within WAA 406, until all new roads are closed. However, the total road density during the peak of activity would remain below the level recommended as a general guideline in the Forest Plan. By maintaining deer capability above the recommended minimum level, and maintaining road density below the recommended maximum level, we expect the wolf population in WAA 406 to be sustainable over the long term.

#### Direct and Indirect Effects on American Marten

The Licking Creek project area is within a high-risk province for marten habitat (Forest Plan Final EIS). In such areas, timber harvest units that contain high-value marten habitat must meet specific Forest Plan Standards and Guidelines. (These are described in Chapter 2 of this Final EIS under Mitigation.) High value marten habitat is calculated using high-volume strata below 1,500 feet elevation (Forest Plan Standards and Guidelines, Wildlife, XVI.2). The Forest Plan set the VCU as the appropriate scale of analysis for this species.

The marten habitat model assumes that all timber harvest is accomplished using traditional even-aged (clearcut) silvicultural prescriptions. Although the effects of alternative harvest methods on marten habitat capability are currently unknown, they probably have less impact than clearcutting, and the model may overestimate the reductions in marten habitat capability for these acres after timber harvest.

Based on the marten habitat model, we estimate that 3,780 acres of high-value marten habitat is currently within the project area (Table 3-8). Beach buffers are of high importance to marten and are protected by Forest Plan Standards and Guidelines, along with riparian management areas. The prescriptions for all units with high-value marten habitat leave the required structure as called for in the Standards and Guidelines. The proposed timber harvest in the action alternatives would reduce this habitat capability by 4 to 15 percent within the project area and by 2 to 7 percent within VCU 7460. The VCU is the most appropriate level at which to analyze marten habitat. Alternative 2 would have the least effect on habitat capability and Alternative 5 the greatest.



**Table 3-8**  
Effects of Proposed Timber Harvest on American Marten Habitat Capability in the Licking Creek Project Area

	Marten Habitat Capability (acres) <sup>1</sup>	
	Project Area	VCU 7460
Existing <sup>2</sup>	3,780	7,759
Alternative 2	3,624 (96% of existing)	7,603 (98% of existing)
Alternative 3	3,371 (89% of existing)	7,350 (95% of existing)
Alternative 4	3,250 (86% of existing)	7,229 (93% of existing)
Alternative 5	3,217 (85% of existing)	7,196 (93% of existing)
Alternative 6	3,598 (95% of existing)	7,577 (98% of existing)

<sup>1</sup>These numbers are presented for comparison purposes only; they are based on acres of timber within the High Volume Strata categories (see discussion under Forested Vegetation.)

<sup>2</sup>Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as already cut in calculating these values.

Source: J. Llanos 2002, 2003; treatment acres from S. Spores 2002, 2003

### Road Impacts on American Marten

Marten are easily trapped and can be over-harvested, especially where trapping pressure is heavy and not effectively controlled. This corresponds closely to the availability of road access. Because of their susceptibility to trapping, marten density declines in areas where road density exceeds 0.2 mile of road per square mile and marten density may be reduced by as much as 90 percent when road density approaches 0.6 mile per square mile (Suring et.al.1992). There is no definitive upper level of road density in the Forest Plan. The Standard and Guideline states that if "...road access has been determined...to significantly contribute to unsustainable marten mortality, implement effective road closures...and develop and implement road management objectives...". Alternatives 2, 3, and 4 propose construction of approximately 1 to 5 miles of new road (including both classified and temporary roads). The Licking Creek and Sea Level projects together would result in a road density of 0.9 to 1.0 mile per square mile for VCU 7460 during project implementation (Table 3-9). All new roads would be closed to motorized vehicles within 3 years of completion of timber harvest, and the open road density would return to the pre-harvest level of 0.8 mile per square mile in VCU 7460. Alternatives 5 and 6 propose no new roads and would not affect open road density. Marten harvest levels are currently low and are not expected to change significantly, because access to the project area is by boat or plane. None of the roads are connected to the Ketchikan road system and road use is limited to foot travel or four-wheeler. Therefore, even though road density is fairly high, road effects on trapping pressure in the VCU are expected to be minimal.

**Table 3-9**  
Open Road Miles and Open Road Density for VCU 7460 by Alternative

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Miles of existing open road <sup>3</sup>	39.0	39.0	39.0	39.0	39.0	39.0
Miles of proposed road construction (Sea Level Timber Sale EIS)	4.1	4.1	4.1	4.1	4.1	4.1
Miles of proposed road construction for Licking Creek project area <sup>2</sup>	0	1.5	2.2	5.5	0	0
Open road density during project implementation <sup>1</sup>	0.9	0.9	0.9	1.0	0.9	0.9
Existing and post-harvest open road density	0.8	0.8	0.8	0.8	0.8	0.8

<sup>1</sup>Road density calculated as linear miles of road per square mile of land.

<sup>2</sup>This includes both classified and temporary road.

<sup>3</sup>Existing open road are currently drivable.

Source: J. Llanos, 2002, 2003

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## Direct and Indirect Effects on Other Wildlife Species

### Northern Flying Squirrel

This species is considered an old-growth associate and was identified as a viability concern in the Forest Plan Final EIS (USDA Forest Service, 1997). Old-growth Reserves are considered to best meet overall habitat needs and should support well-distributed populations capable of interacting across landscapes (Forest Plan). Beach, estuary, and riparian management areas also help to maintain connectivity and allow interaction. Other than these reserve areas, impacts to northern flying squirrel would be proportionate to the amount of productive old growth harvested (see Biodiversity section). Standards and Guidelines for marten that retain 10-20 percent of the original stand structure may also provide limited habitat for flying squirrels within the project area.

### Band-tailed Pigeon

Band-tailed pigeons are linked to old-growth habitat. They are known to be secretive nesters and may therefore be more plentiful in an area than commonly believed. In a worst-case scenario, habitat can be expected to be reduced in proportion to the amount of old-growth forest harvested. Alternatives 2 and 6 would reduce habitat the least of the action alternatives (less than 2 percent at the VCU level) and Alternatives 4 and 5 the most (less than 5 percent at the VCU level). Alternative 3 would harvest an intermediate level of about 3 percent. This translates to a cumulative 25 to 27 percent reduction in VCU 7460 since 1954 conditions. A survey in Spring 2003 did not detect any birds; further surveys are planned for Summer 2003 to look for the birds and their potential nests. The population would be monitored for 3 years post-harvest to determine if the birds are present and continue to exhibit breeding behavior. (The Forest Plan does not require any survey or monitoring efforts for band-tailed pigeons. These continued efforts to locate a nesting population are a proactive approach to learning more about this species on the Tongass National Forest.)

### Marbled Murrelet

Habitat would be reduced under the action alternatives as high-volume old growth is clearcut. Fragmentation/increased edge effect may also decrease habitat for murrelets. Marten Standards and Guidelines for reserve trees may maintain some habitat within harvested stands. This would be dependent upon the location, patch size and density of the reserve trees. Old Growth Reserves, Misty Fjords National Monument, and other non-harvest areas maintain larger patches of old growth. Larger stand size may be important to murrelets to reduce predation at nests (DeGange 1996). The proposed timber harvest in the action alternatives would reduce current habitat by 3 to 11 percent within the project area, by 2 to 6 percent within VCU 7460, and by 1 to 2 percent within WAA 406. Alternative 2 would have the least impact on habitat capability and Alternative 5 the greatest. Surveys are ongoing in the vicinity of the nest site and the required 600-foot forested buffer would be applied prior to unit layout.

### Hérons and Raptors

Cavity-nesting species, such as small owls, should have a sufficient number of snags remaining for their use in the project area (see Biodiversity and Old Growth section for more information). Red-tailed hawks should benefit because they often nest along the edge of existing units and hunt in open areas. Heron foraging habitat is protected with the 1,000-foot beach/estuary fringe standard. Old-growth Reserves and other non-harvest areas provide habitat for other species. Any nests located would receive the required buffer.

## Cumulative Effects

### Alternative 1 (No Action)

Habitat capability for deer, wolf, marten and other wildlife would be reduced by the Madder and Buckdance Timber Sale units (Sea Level Timber Sale EIS), which have been sold and are scheduled to be harvested (Table 3-9). The Mop Point/91 Knot Timber Sales would not have an appreciable effect on habitat capability at the project area or landscape scale. Deer and marten habitat capability would slowly improve over time as re-growth occurred in previously harvested units. Deer numbers would continue, for the foreseeable future, to be above the minimum recommended density to maintain wolf populations at the WAA level. Road density in WAA 406 would be within the recommended levels for wolves. The effects of trapping on

both wolves and American marten are low and expected to remain stable since access to the area is by boat or plane.

## **Alternatives 2, 3, 4, 5 and 6**

Habitat capability for deer, wolf, marten and other wildlife would be reduced by the Madder and Buckdance Timber Sale units (Sea Level Timber Sale EIS), which have been sold and are scheduled to be harvested, and further reduced by the action alternatives (Table 3-9). The Mop Point/91 Knot Timber Sales would not have an appreciable effect on habitat capability at the project area or landscape scale. Of the Licking Creek action alternatives, Alternative 2 would have the least effect, and Alternative 4 the greatest. Deer and marten habitat capability would continue to be reduced below historic levels. They would slowly improve over time as re-growth occurred in previously harvested units and “stem exclusion” effects diminished. Deer densities to support wolf populations and current harvest levels would be reduced, but this effect would not be substantial at the WAA level. The density would continue to meet the recommended 18 deer per square mile at the project, VCU, and WAA levels for the foreseeable future. Hunter demand in the area is a small percentage of the habitat capability, and is not expected to be significantly impacted by this project.

New road construction is scheduled to occur in WAA 406 under the Madder and Buckdance timber sales, analyzed in the Sea Level Timber Sale EIS; these are scheduled to be sold. The cumulative effect of road construction for these sales and the Licking Creek action alternatives would remain below the Forest Plan recommended 0.7 to 1.0 mile per square mile for wolves. Any new roads would be closed approximately 3 years after timber harvest for both the Sea Level Timber Sale EIS timber sales and proposed Licking Creek sales, and post-harvest open road density would return to existing levels. Road density in WAA 406 would be within the recommended levels for wolves. However, new roads would expand access into more remote areas, and may increase hunter success. The cumulative effects of these influences may increase the harvest of game and fur species for a few years within WAA 406, especially during project implementation and until all new roads are closed. The increase in road density during project implementation could affect marten trapping for a short time but is not expected to remain elevated due to the remoteness of the project area.

Private lands are given a habitat value of zero in the habitat models for analysis purposes, and consequently any management actions on those lands have no negative effects on the model results. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future.

## Issue 3: Watersheds and Fish Habitat

**Issue Statement: Water quality and fish habitat may be affected by the cumulative effects of past and proposed timber harvest and road construction.**

This section summarizes fish and water data collected in the Licking Creek project area, and analyzes the effects of proposed harvest areas and road locations on water quality and fish habitat. This was identified as an issue by the Interdisciplinary Team due to the existing level of timber harvest in the project area watersheds. We used updated geographic information system (GIS) data to help quantify the amount of critical fish habitat. We used data gathered during the 2000, 2001, and 2002 field seasons to refine the unit boundaries and identify stream courses that need protection. This approach is in accordance with the Forest Plan.

### Affected Environment

#### Watersheds

The Licking Creek project area was delineated into seven watersheds (Table 3-10, Figure 3-3), according to National Hydrologic Unit Codes (HUCs) (D. Kelliher et. al. December 2000). For analysis, three small first-order watersheds were combined into Unnamed (00).

All of the project area watersheds are U-shaped valleys, longer than they are wide. The ridges separating them average 2,500 feet in elevation, and reach up to 3,800 feet on the eastern boundary of the project area. The distances between ridge tops do not exceed 3 miles in any of the watersheds. All of the streams drain west-southwest into Carroll Inlet.

Table 3-10  
Project Area Watersheds<sup>1</sup>

Watershed Name	Size (acres)	Size (sq. miles)	Stream Miles	MMI 3 or 4 Soils <sup>2</sup> (%)
Unnamed (00)	688	1.1	1.3	57%
Licking Creek (08)	4,107	6.4	21.4	65%
Unnamed (13)	573	0.9	3.8	43%
Calamity Creek (14)	4,231	6.6	19.8	50%
Unnamed (19)	829	1.3	6.7	59%
Marble Creek (20)	3,721	5.9	17.8	54%
Easy Creek (21)	3,871	5.9	23.8	54%

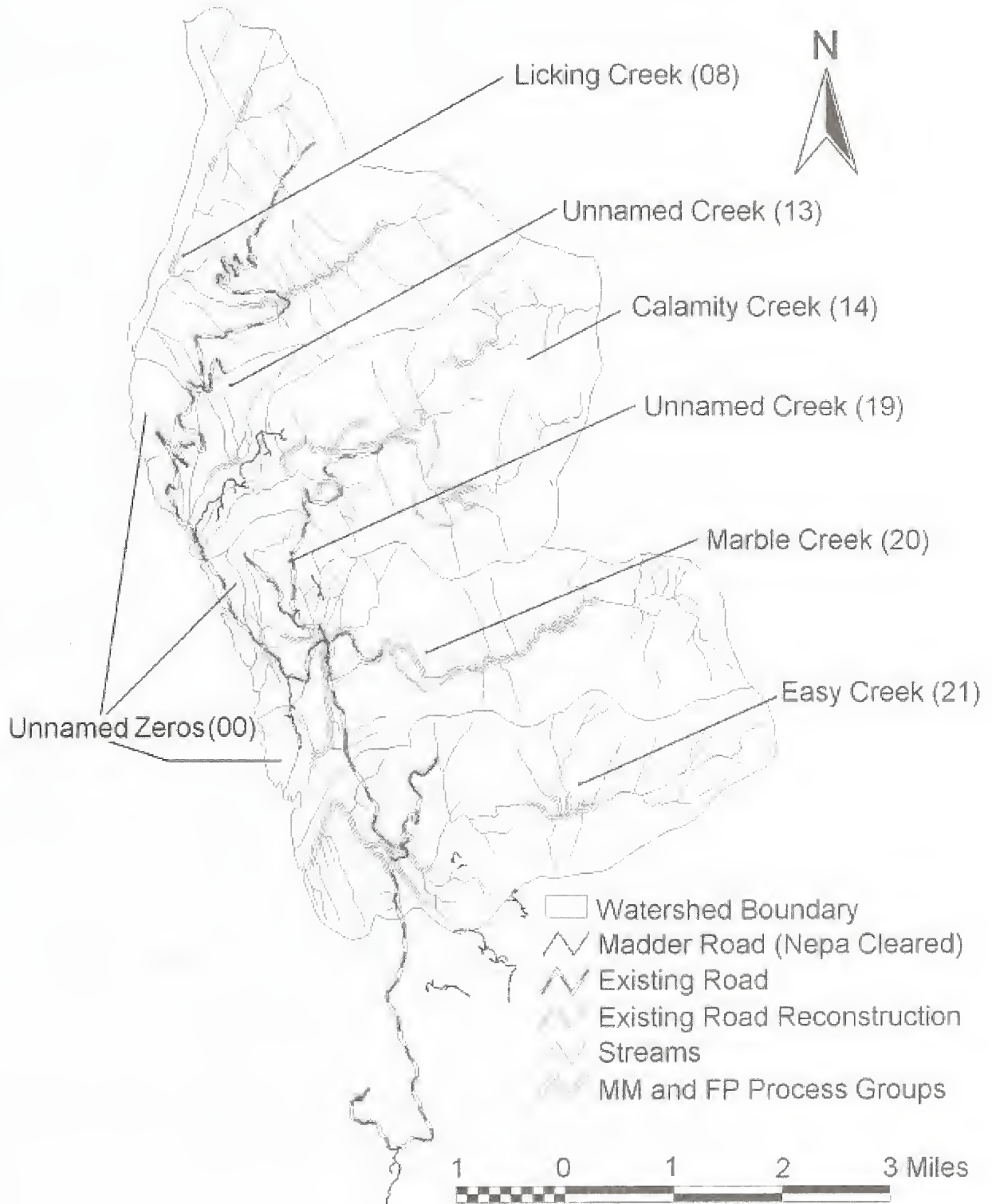
<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Designates percent of watershed rated to have high (3) and very high (4) potential for mass movement erosion (slides).

Source: R. Sainz, 2002



Figure 3-3  
Timber Sale Project Area Watersheds, Streams, and Roads



Source: R. Sainz, GIS 2002

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## Project Area Streams

Existing conditions in streams and fish habitat were determined using information from the following sources:

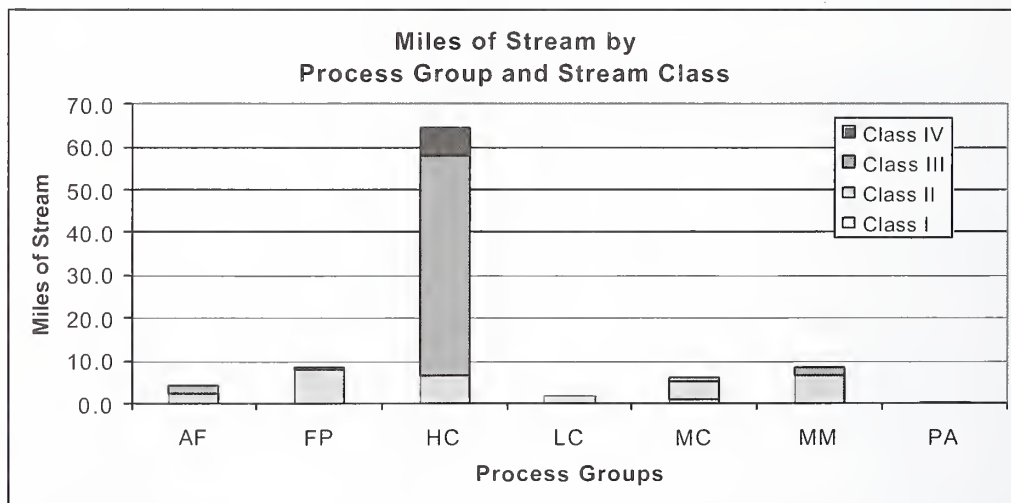
- GIS data layers and analysis,
- ADF&G Anadromous Stream Catalog (1984, 1989),
- Watershed and fisheries information gathered for the Sea Level Timber Sale EIS,
- Forest Service stream inventory, to determine stream channel types and potential fish habitat, and
- Forest Service snorkel surveys, to verify presence or absence of fish.

Stream and fish habitat conditions are summarized below. For more detailed information, see the Watersheds and Fish Habitat resource report, in the project planning record.

The project area contains relatively little high-quality fish habitat, which is generally found in the floodplain (FP) and moderate-gradient mixed-control (MM) stream process groups (Figure 3-4). These are found in all of the project area watersheds, in short reaches, and provide resident fish habitat. Because sediment tends to settle in these channel types, they are sensitive to transport of sediment from upstream.

Because of the steepness of the terrain and morphology of the channels in the project area watersheds, most of the streams are high-energy stream reaches: moderate-gradient contained (MC), low-gradient contained (LC), and high-gradient contained (HC) process groups (Figure 3-4). These tend to transport sediment rather than store it, and so are relatively resilient to upstream effects, but are generally not as productive for fish as the floodplain (FP) and moderate-gradient mixed-control (MM) channel types (which are limited in the project area). However, anadromous fish habitat in the project area occurs in moderate-gradient contained (MC) stream reaches in Licking Creek and Calamity Creek, just above saltwater.

Figure 3-4  
Miles of Stream by Process Group<sup>1</sup> and Stream Class in Licking Creek Project Area



<sup>1</sup> AF = Alluvial Fan, FP = Flood Plain, HC = High-gradient Contained, LC = Low-gradient Contained, MC = Moderate-gradient Contained, MM = Moderate Gradient, Mixed Control, PA = Palustrine. These process groups are described in more detail in Appendix B, of the Draft EIS, Unit and Road Cards, Introduction.  
Source: R. Sainz, 2002

## Fish Habitat

Streams were classified into four types based on fish production values (Table 3-11). Class I streams provide spawning and rearing habitat for anadromous fish species (Pacific salmon). Class II streams support resident fish populations where no anadromous fish occur and otherwise do not meet Class I criteria. Class III streams are perennial streams that do not support fish populations, but have sufficient flow or transport sufficient sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. Class IV streams are intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability (Glossary, Forest Plan).

Table 3-11  
Length in Miles of Stream by Class I, II, III and IV for each Project Area Watershed<sup>1</sup>

Watershed	Stream Class <sup>2</sup>				Total Miles of Stream
	Class I Anadromous fish habitat	Class II Resident fish habitat	Class III Flow into fish habitat	Class IV No flow into fish habitat	
Unnamed (00)	0.0	0.0	0.0	1.3	1.3
Licking Creek (08)	0.5	6.9	13.4	0.3	21.4
Unnamed (13)	0.0	1.1	2.7	0.0	3.8
Calamity Creek (14)	0.2	3.9	15.2	0.6	19.8
Unnamed (19)	0.0	3.4	1.3	1.9	6.7
Marble Creek (20)	0.0	7.1	9.5	1.2	17.8
Easy Creek (21)	0.2	7.6	14.9	1.1	23.8
<b>Total Miles</b>	<b>0.9</b>	<b>30.0</b>	<b>57.0</b>	<b>6.4</b>	<b>94.6</b>

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Determined from GIS analysis and stream surveys.

Source: R. Sainz, 2002

The project area contains very little high-quality fish habitat in terms of MM (moderate gradient mixed control) and FP (floodplain) channel types. Reports by the Alaska Department of Fish and Game state that no sport fish potential exists at any of the project area watersheds. The ADF&G also conducts no aerial peak escapement counts for pink or coho salmon in the project area watersheds because the production capabilities are so low.

### Management Indicator Species (MIS)

Management Indicator Species (MIS) are those fish species whose responses to land management activities are thought to reflect the likely responses of other species with similar habitat requirements. The responses of MIS species are studied and monitored, in order to predict the impacts to entire assemblages of species and associated habitats. They are also used to help establish management goals. Coho and pink salmon were selected in the Forest Plan to monitor anadromous fish habitat, and Dolly Varden and cutthroat trout were selected to monitor resident fish habitat.

In cooperation with the Alaska Department of Fish and Game, monitoring strategies are still in development for monitoring of coho and pink salmon habitat. The Forest Service began monitoring of resident fish habitat in 1998, in order to assess changes in habitat or population structure where 1997 Forest Plan Standards and Guidelines have been applied to timber sales. However, none of the sales where monitoring studies have been established has been cut, and the monitoring results are not yet available. No sites that meet the monitoring criteria occur in the project area. For these reasons, MIS species were not selected for the Licking Creek project. We did, however, examine the effects of the project on habitats for these species.

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#### Anadromous Fish Habitat

Essential Fish Habitat is stream habitat that is used by anadromous fish (coho, pink, and chum salmon), primarily for spawning and juvenile rearing. This is classified as Class I stream habitat (Table 3-11). Adult salmon spawn in the lower reaches of watersheds, downstream of proposed timber harvest and road construction activities. Juvenile coho rear in freshwater streams, feeding predominantly on aquatic and terrestrial insects. The other fish species and life stages generally do not feed in freshwater.

We conducted stream surveys to identify salmon habitat and snorkel surveys to verify the presence or absence of fish. Chum salmon were observed in the streams, but no coho fry were observed at the time of survey. Nearly all the anadromous habitat in the project area lies within the 1,000-foot beach fringe buffer.

We also used "habitat capability" models to compare Class I habitat quality between the streams. These models assume a relationship between the physical characteristics of a stream channel (channel type) and the potential for production of smolts. Smolts are the life history stage of anadromous fish that return to the open ocean.

Licking Creek contained the greatest length of Class I habitat in the project area, approximately 2,500 feet from salt water to a fish migration barrier. However, the production capability of this habitat was low compared with Easy Creek (Table 3-12), due to its channel type (moderate-gradient contained, MC2). The habitat in Easy Creek was predicted to be the most productive in the project area for pink salmon production, due to the channel type (low-gradient controlled, LC2). Calamity Creek contained about 650 feet of anadromous fish habitat (moderate controlled, MC1 channel type) below a salmon migration barrier. No anadromous or resident fish were observed in Calamity Creek during snorkel surveys in August 2000.

Table 3-12  
Predicted Salmon Smolt Production

Fish Species	Watershed						
	Unnamed (00)	Licking Creek (08)	Unnamed (13)	Calamity Creek (14)	Unnamed (19)	Marble Creek (20)	Easy Creek (21)
Pink smolts	0	507	0	201	0	0	13,936
Coho smolts	0	169	0	26	0	0	165

Source: GIS, R. Sainz 2002

#### Resident Fish Habitat

Most of the watersheds in the project area support some resident fish habitat (Class II streams, Table 3-11). Most Dolly Varden observed during stream surveys were found in Easy Creek, Unnamed 19, and Licking Creek. We conducted snorkel surveys in August 2000 in low-gradient reaches of Calamity Creek and Marble Creek, but found no fish in these watersheds.

**Licking Creek** contains the highest-quality (most productive) resident fish habitat, as compared with the other watersheds in the project area.

High-quality resident fish habitat also occurs in **Unnamed 13** watershed, below an alluvial fan in the center of the watershed.

**Unnamed 19** watershed contains about 3.4 miles of resident fish habitat. In 1996, the District surveyed this stream as part of the Sea Level Timber Sale EIS and identified a 20-foot waterfall near salt water that precludes salmon migration. In 2000, the District replaced the culvert on the 8400-mainline road to allow fish passage.

**Marble Creek** contained resident fish habitat on the eastern portion of the watershed and in the lower reaches. The upper reaches of Marble Creek contained some of the highest-quality



resident fish habitat in the project area; however, no fish were observed above Road 8400000 mainline road crossing. A major landslide occurred as a result of past timber harvest and road construction in the north-central portion of the watershed, however, the debris did not encroach upon the mainstem channel.

## Riparian Management Areas

This project would implement the Riparian Standards and Guidelines as set forth in the 1997 Forest Plan. These were specifically developed through a collaborative effort involving lead watershed and fisheries scientists from Federal (management and research) and State (ADF&G, ADEC) agencies. Standards and Guidelines were conservatively established to minimize any impacts to aquatic resources from management activities.

Application of the Riparian Standards and Guidelines requires the identification of Riparian Management Areas (RMAs). All fish-bearing Class I and Class II streams receive a minimum 100-foot no-harvest buffer, with some stream process groups receiving larger buffers. All Class III streams receive a slope break buffer, which means that trees within the slopes of the stream are left standing. Additional windfirm buffers may be applied to ensure that the trees within the sideslopes remain standing. RMA buffers are displayed on the unit card maps in Appendix B of the Draft EIS.

## Effects of Past Management Actions

Portions of the project area have been previously harvested. The earliest road-accessible harvest occurred around 1954 with subsequent entries almost every 5 years to 1996. Between the years of 1972 and 1974, 1,330 acres were harvested; 103 of those acres were harvested on private land. (See also the discussion of past harvest in the Silviculture and Timber Management section in this chapter.)

### Existing Roads

In 1996, Road Condition Surveys (RCSs) were conducted as part of the Sea Level Timber Sale EIS, which identified several fish stream crossings that prevented fish passage. In 2000, we made corrections to several of these crossings. These included the replacement of 12 culverts with larger culverts, one bridge on a Class II stream, and downstream modifications to Class I stream. This ensured passage on the fish-bearing streams that contained the most fish habitat upstream of roads.

We conducted Road Condition Surveys of existing roads in the project area in 2000 and 2001 to identify additional road reconstruction activities. The road cards in Appendix B of the Draft EIS contain the existing condition information and prescribed mitigation measures for each road, based on the Road Condition Surveys.

Some areas of surface erosion and slumping were identified. The 8446-road in the Licking Creek watershed contains some drainage problems, where water crossing the road could cause problems to fish habitat if not corrected as part of this timber sale. The erosion does not currently affect fish habitat, as the erosional material is deposited into adjacent forested wetland and the riparian area and does not reach the stream. In general, the existing roads do not present problems to water quality.

Stream crossings on roads were also evaluated. One Class I stream crossing is located at the lower reach of Calamity Creek on the 8400-mainline road. This crossing is a bridge that does not prohibit passage of fish. The project area has 29 existing Class II stream crossings, of which 13 may impede fish passage due to gradients that exceed 18 percent or other factors. These crossings were assessed in the field in 2002 to evaluate the quantity and quality of fish habitat at those 13 sites. The results of these assessments will be used to determine work priorities at the Forest level. All these crossings impeding fish passage will be replaced, most likely as part of a separate effort from a timber sale project. The project area also has 23 existing Class III stream crossings and 21 existing Class IV stream crossings.

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Table 3-13  
Past Timber Sale Activities in Project Area Watersheds<sup>1</sup>

Watershed Name	Size (acres)	Existing Roads (miles)	Existing <sup>2</sup> Timber Harvest (acres)	Existing Timber Harvest (%) <sup>3</sup>
Unnamed (00)	688	3.6	70	10.2
Licking Creek (08)	4,107	8.2	588	14.3
Unnamed (13)	573	1.2	137	23.9
Calamity Creek (14)	4,231	3.2	482	11.4
Unnamed (19)	829	4.5	354	42.7
Marble Creek (20)	3,721	7.6	1,046	28.1
Easy Creek (21)	3,871	9.8	1,201	31.0
<b>Total<sup>1</sup></b>	<b>18,020</b>	<b>38.1</b>	<b>3,878</b>	

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Timber harvested from 1954 to 1996.

<sup>3</sup> Percent of watershed area.

Source: R. Sainz, 2002

#### Past Riparian Harvest

Riparian forests maintain stream habitat by providing large woody debris and root masses, which dissipate stream energy, maintain habitat structure, and stabilize stream banks. When riparian area trees are removed by timber harvest, it takes approximately 30 years before trees are sufficiently regrown to maintain stable stream banks, and perhaps as long 150 years before large wood is available for recruitment into the channel to dissipate stream energy.

Riparian areas on Class II streams were harvested in the Licking Creek project area as late as 1994 (Table 3-14; Figure 3-5), prior to implementation of the 1997 Forest Plan Riparian Standards and Guidelines. Because the sales were sold prior to the Tongass Timber Reform Act, stream buffers were rarely greater than one tree length from the edge of the stream. The results of this past harvest, described below, were considered during development of the Licking Creek project, and several units were dropped or their boundaries adjusted to protect riparian and stream habitats. Although all alternatives implement Forest Plan Riparian Standards and Guidelines for habitat protection, Alternative 2 was specifically designed to avoid timber harvest of areas that have a potential to degrade stream habitat or are near heavy riparian harvested areas.

Table 3-14  
Percent of RMA Acres Harvested (1954-1994) by Watershed<sup>1</sup> and Stream Class

	Stream Class I RMA Harvest		Stream Class II RMA Harvest		Stream Class III RMA Harvest	
	Years	%	Years	%	Years	%
Unnamed (00)	N/A	0	N/A	0	N/A	0
Licking Creek (08)	1962	5	1992 1993	5 23	1962-1996	21
Unnamed (13)	N/A	0	1954	0.1	1990	21
Calamity Creek (14)	1961	26	1961-1974	0.5	1989	12
	1962	16	1989	12	1990	4
			1990	0.9	1994	0.8
			1994	0.5		
Unnamed (19)	N/A	0	1974	36	1974	57
Marble Creek (20)	N/A	0	1972	36	1972	0.3
			1974	39	1974	6
			1980	3		
Easy Creek (21)	N/A	0	1972	32	1972	31

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.  
Source: Estimated from GIS analysis, J. Llanos 2001

Approximately 28 percent of the Class II Riparian Management Areas (RMAs) in the **Licking Creek** watershed experienced harvest in 1992-1993. This included some harvest of floodplain RMA. During recent surveys, we found that the channel depth was shallower and flows were swifter in the harvested area than in the floodplain upstream. Additionally, after construction of Road 8446200 and timber harvest in the watershed, small landslides occurred that crossed the road and entered the floodplain. The District planted spruce trees after this harvest, and survival surveys conducted in 1996 showed good survival rates. The Class I riparian harvest occurred in the beach fringe and was harvested without road construction. This harvest is 40 years old and the vegetation is regrowing.

**Unnamed 13** watershed experienced a small amount of riparian harvest in the headwaters. However, stream surveys in this area and downstream showed no evidence of stream degradation, and the fish habitat appeared adequate to support fish.

Harvest of the Class I RMA in **Calamity Creek** in the early 1960s appears to have had little to no adverse effects on fish habitat, as the channel is naturally deeply incised and hard-bottomed with bedrock. Timber harvest in 1989 removed the riparian buffer on Class II habitat in the center of the watershed. This harvest did not appear to affect the habitat downstream. Some Class III alluvial fan habitat in the southeastern portion of the watershed was also harvested in 1989. Stream surveys in 2000 identified bank erosion where Road 8444000 crosses Calamity Creek for the first time. This erosion is confined to the vicinity of the crossing and from two sources: all-terrain vehicles crossing the creek, and road material left near the creek when the bridge was removed.

Harvest of the Class II RMA in **Unnamed 19** watershed took place on high-gradient contained (HC2 and HC3) channels, which are marginal as fish habitat. Additionally, Class II riparian habitat was disturbed by the construction of Road 8400000. In recent surveys, we observed heavy alder thickets growing below the stream crossing, and the channel was showing widening and deposition of material.

**Marble Creek** experienced substantial riparian timber harvest along Class II portions of the stream system. Approximately 7,800 feet of harvested stream channel, above Road 8400000,

# 3 Environment and Effects

## Summary of Watershed Conditions

showed decreased habitat complexity and loss of large woody debris. However, riparian harvest in the upper watershed contained complex habitat and appeared unaffected. Increased sedimentation was observed in Marble Creek below Road 8400000. This sediment appeared to be from small V-notch tributaries in the lower watershed. Some landsliding was observed, but the mainstem channel downslope of the slide was hard-bottomed and showed little deposition of material.

Thirty-two percent of the Class II RMA was harvested in **Easy Creek** in 1972. This harvest occurred both above and below Road 8400000. Tall alders dominated the canopy and the channel appeared significantly widened, as evidenced by shallow stream banks. Most of the substrate consisted of large cobble and boulder, which was larger material than that found in most of the watershed streams. Below the riparian harvest, the channel was contained and bedrock controlled, and fish were observed. Within this watershed, but outside of the project area, Road 8400441 washed out above the intersection with Road 8400440; this erosion may have affected downstream fish habitat.

The Licking Creek project area lies within the Sea Level Timber Sale EIS project boundary. As part of the Sea Level Timber Sale Draft EIS (1998), a sediment risk assessment was run to characterize and rank watersheds based on geological and hydrological (geo-hydromorphic) risk factors to address four of the core topics identified in the Waters Analysis Handbook: Mass Slope/Erosion (potential for landslides/landslides), Hydrology, Stream Channel, and Vegetation Management. The landscape-level sediment risk assessment focuses on the nature and extent of sediment sources within each watershed. Each watershed receives a relative sediment risk index (SRI) score that evaluates existing condition, and a potential impact index (PII) score that evaluates existing condition combined with proposed management activity. The watersheds are rated against each other, and the watershed that receives the highest risk rating, based on the four core items, is given a score of 100.

The Sea Level project area included 59 watersheds greater than 0.5 square miles; it did not include 39 first-order watersheds. The Sea Level sediment risk assessment included the following Licking Creek project area watersheds: Licking Creek, Unnamed 13 (a.k.a. I13A), Calamity Creek, Unnamed 19 (a.k.a. I15A), Marble Creek, and Easy Creek. Of these six creeks, Easy Creek received an SRI score of 56 on a scale of 100. Marble Creek received an SRI score of 52, followed by Unnamed 13 with an SRI of 50 and Unnamed 19 with an SRI of 49. Licking Creek received an SRI score of 38, and Calamity Creek an SRI of 34. It should be noted that all of these watersheds rated at moderate risk, compared with all of the Sea Level watersheds.

We evaluated whether to conduct watershed analyses within the project area and determined that they were not needed for several reasons. There is no significant fish habitat relative to production capabilities of other areas within the cataloging unit or watershed association. The composition of channel types consist of mostly high gradient, hard bottomed, transport channels. The resiliency of the stream channels, mostly high-gradient contained or hard bottomed, and low quality in terms of fish production, act to negate the previous harvest level. In summary, there are no significant habitats or populations downstream of sediment sources (transport stream systems). Additionally, none of the streams in the Licking Creek project area appear on the State of Alaska's list of water bodies with impaired uses (Clean Water Act, Section 303(d) report).

Although no watershed analysis was completed, the team did consider risks to water quality and fish habitat. Areas of high concern were removed from consideration in any alternative. (These are discussed below.) With the removal of units of concern, harvest of the units proposed in any of the alternatives would pose little to no risk to downstream fish habitat. Field reconnaissance and surveys, of every unit considered in each alternative, verified the lack of transport potential to fish habitat. All transport streams with downstream potential effects were buffered in accordance with Forest Plan Riparian Standards and Guidelines, or otherwise



excluded from harvest, to prevent effects to downstream fish habitat and maintain channel integrity and function.

In **Licking Creek**, some of the landslides that occurred in the watershed and ended up in the floodplain occurred adjacent to areas initially proposed for harvest; those areas were removed from consideration in any alternative. Additionally, proposed units located on the north stem of Licking Creek were also removed from consideration in any of the alternatives, due to a road crossing over a deeply incised V-notch on the west end of Unit 8.

Three units in **Unnamed 13 Watershed** would have raised the cumulative harvest in that watershed above 50 percent in less than 10 years (if Madder Timber Sale units and Licking Creek units were harvested). These units were removed from consideration in any alternative. Of more concern, a road would have been constructed over an alluvial fan immediately upstream of high-quality (MM1) fish habitat in that watershed. In the Sea Level Timber Sale EIS, this watershed included new road construction to access units 88, 89, and 90. The planned road crossed the Class II stream four times; however, during implementation the road was re-designed to avoid all of the crossings.

In **Calamity Creek**, four units were removed from consideration in any alternative to meet soil and water concerns. In addition, another unit in that watershed was removed from consideration to protect karst deposits and features. During field surveys, proposed harvest units were also reconfigured to meet soil and water resource concerns.

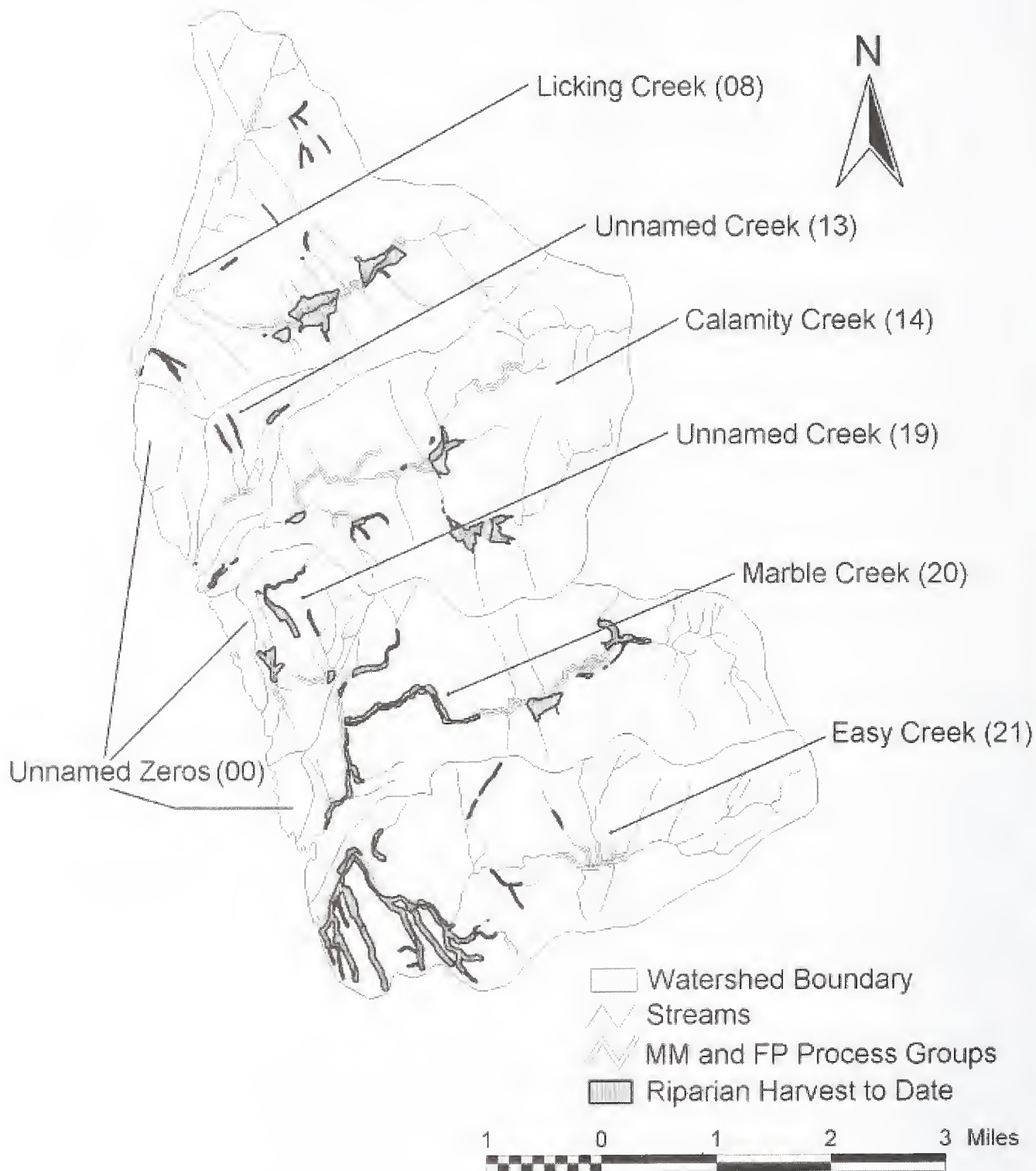
In **Unnamed 19 Watershed** three units were removed from consideration in any alternative because they presented risks to the soil and water resources in the watershed. One proposed unit was located immediately above a Sea Level Timber Sale EIS unit, and was dropped to avoid potential impacts to downstream fish habitat. Another proposed unit, located immediately upstream of some high-quality habitat (MM channel type), was dropped due to the amount of road construction that would be needed to access it. The team dropped a third unit from consideration due to the amount of other proposed harvest and high-quality fish habitat surrounding the unit.

In **Marble Creek**, several proposed units on the east and north sides of the upper floodplain terrace were removed from consideration in any alternative. This eliminated a road crossing on the upper floodplain terrace, where some of the best intact fish habitat occurs in that watershed. Areas above road 8442100, on the north side of the watershed, experienced some landslide activity. The initial unit pool contained three units above that road. Those units were subsequently removed from consideration. Two other units located along a north tributary into Marble Creek were also removed. These units included many Class IV streams that drain into the tributary.

In **Easy Creek**, no stream surveys were conducted prior to any harvest that occurred in the 1970s and 1980s, which would have established pre-harvest conditions in the watershed. Field reconnaissance and surveys showed that all initially proposed units in the watershed were in areas that posed no risk to soils and water resources.

### 3 Environment and Effects

Figure 3-5  
Existing Timber Harvest in Riparian Management Areas



Source: R. Sainz, 2002

## Environmental Consequences

### Direct and Indirect Effects of Timber Harvest

Potential impacts that may result from timber harvest are elevated stream temperatures, surface erosion in timber harvest units, and elevated runoff and sediment resulting from removal of upland vegetation. Long-term studies that can quantitatively describe the direct or cumulative impacts of timber harvest activities on these factors do not yet exist for ecosystems in the Tongass National Forest. To address these concerns, which arose during the last Forest Plan revision, Congress assigned a panel of fisheries and hydrology experts to assess the potential impacts that land management activities might have on fish habitat in Alaska. The panel presented their findings to Congress in January 1995, in a document titled Anadromous Fish Habitat Assessment (AFHA). Many of these findings were directly incorporated into Fish Standards and Guidelines in the 1997 Forest Plan. When Forest Plan Standards and Guidelines are applied, fish habitat degradation is expected to be negligible (Forest Plan ROD).

According to direction issued in the Forest Plan, Appendix J, a watershed analysis is not required if a timber sale will fully implement the Forest Plan Standards and Guidelines. The Licking Creek project does not require a watershed analysis because we will fully implement Standards and Guidelines on all streamcourses in the project area.

Although no watershed analysis was completed, the team did consider risks to water quality and fish habitat. Areas of high concern were removed from consideration during alternative development. (This is discussed above under Summary of Watershed Conditions.)

### Clean Water Act and Best Management Practices (BMPs)

Congress intended the Clean Water Act of 1972 (Public Law 92-500) as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4) to protect and improve the quality of water resources and maintain their beneficial uses. Section 313 of the Clean Water Act and Executive Order 12088 of January 23, 1987 address Federal agency compliance and consistency with water pollution control mandates. Agencies must be consistent with requirements that apply to "any governmental entity" or private person. Compliance is to be in line with "all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution."

The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution. The National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) provide a protection and improvement emphasis for soil and water resources and water-related beneficial uses. Soil and water conservation practices (BMPs) were recognized as the primary control mechanisms for nonpoint source pollution on National Forest System lands. The Environmental Protection Agency supports this perspective in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

None of the streams in the Licking Creek project area appear on the State of Alaska's list of water bodies with impaired uses (Clean Water Act, Section 303(d) report).

The Forest Service must apply Best Management Practices that are consistent with the Alaska Forest Resources and Practices Regulations to achieve Alaska Water Quality Standards. The site-specific application of BMPs, with a monitoring and feedback mechanism, is the approved strategy for controlling nonpoint source pollution as defined by Alaska's Nonpoint Source Pollution Control Strategy (October 2000). In 1997, the State approved the BMPs in the Forest Service's Soil and Water Conservation Handbook (FSH Handbook 2509.22, October 1996) as consistent with the Alaska Forest Resources and Practices Regulations. This Handbook is incorporated into the Tongass Land Management Plan.

Best Management Practices can include, but are not limited to, structural and nonstructural controls, operation and maintenance procedures, and scheduling and distribution of activities. The site-specific application of BMPs are designed with the consideration of geology, land type, hydrology, soil type, erosion hazard, climate, cumulative effects, and other factors.

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A discharge of dredge or fill material from normal silviculture activities, such as harvesting for the production of forest products, is exempt from Section 404 permitting requirements in waters of the United States, including wetlands (404(f)(1)(A)). Forest roads qualify for this exemption only if they are constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and chemical and biological characteristics of the waters are not impaired (404(f)(1)(E)). The BMPs that must be followed are specified in 33 CFR 323.4(a). These specific BMPs have been incorporated into the Forest Service's Soil and Water Conservation Handbook under BMP 12.5.

The Forest Implementation Monitoring and Evaluation Group (IMEG) monitors appropriate BMP application, whether they were correctly implemented, and if not, whether corrective actions were taken. In 2000, the evaluation of results shows that the Tongass had successfully implemented the BMPs (Appendix B, Table 1, page 11, Tongass Monitoring and Evaluation 2000 Report). This monitoring occurred in the Shelter Cove and Shoal Cove road systems. The Licking Creek project area lies in the same Watershed Association (HUC5) and Value Comparison Unit (VCU) where the monitoring occurred. No culverts have been replaced along the Shoal Cove road system since the 2000 monitoring was completed.

In 1999, the Tongass National Forest developed and implemented monitoring to determine whether Fish and Riparian Standards and Guidelines are effective in maintaining or improving fish habitat. We are beginning to monitor trends in populations of Dolly Varden and cutthroat in streams subject to forest management under the current standards and guidelines. These studies are long-term and the results will not be available for several years.

#### Runoff and Sediment

We believe the risk of stream bank erosion or introducing excessive sediment to fish habitat from this timber sale is minimal, as all proposed harvest units are upstream and away from fish streams, and riparian buffers would be applied as prescribed in the Riparian Standards and Guidelines. However, some changes in flow regime may occur due to removal of vegetation (by timber harvest) and reduced evapotranspiration. Acres of proposed harvest by watershed and alternative are presented in Table 3-15. These unit acres include areas that would not be harvested, such as riparian buffers, deferrals for marten habitat and soils concerns, etc.

Table 3-15  
Proposed Harvest Unit Acres<sup>1</sup> Listed by Watershed and Alternative

Watershed	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Unnamed (00)	0	0	41	30	24
Licking Creek (08)	85	191	193	253	112
Unnamed (13)	1	1	12	12	1
Calamity Creek (14)	89	213	175	183	0
Unnamed (19)	1	34	147	61	18
Marble Creek (20)	47	54	123	130	26
Easy Creek (21)	30	80	99	96	33
<b>Total Acres</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>214</b>

<sup>1</sup> Unit acres include areas not proposed for harvest, such as riparian buffers, deferrals for marten habitat and soils concerns.

Source: R. Sainz, GIS, 2002, 2003

#### Stream Temperature

Mandatory no-cut buffers established on all Class I – III streams for all alternatives would significantly reduce the likelihood of temperature-related effects to streams within the Licking Creek project area. Proposed timber harvest units would have a 100-foot (minimum) no-cut buffer between the unit and Class I and II streams. Class III streams would receive a no-cut



buffer from the edge of the channel to the first slope break. Class IV streams do not receive mandatory no-cut buffers under the Forest Plan. No significant effects are expected on water temperature under any of the action alternatives.

Water temperature monitoring conducted in Traitors River and Klam Creek, as part of North Revillagigedo Timber Sale EIS, indicated that temperature increases do not directly correlate to timber harvest activity in those watersheds. The temperatures at those locations prior to and after timber harvest do not show any significant differences in temperature and rarely exceed 59°F (15°C) except in mid July to late July.

## Large Woody Debris

Mandatory no-cut buffers established along all Class I – III streams on all action alternatives decrease the likelihood of a reduction in the short or long-term recruitment of large wood to streams. There is no anticipated reduction of large wood recruitment in the Licking Creek project area as a result of the proposed harvest. Although the stream surveys did not quantify the amount of wood, part of the survey objective was to identify areas for placement of large woody debris and none were identified. The channels that did not contain large woody debris were bedrock-controlled; large woody debris does not influence stream morphology in these channel types.

We anticipate minimal impacts to fish habitat from the proposed road construction, reconstruction, and related activities. These activities would follow all appropriate Best Management Practices (BMPs) as outlined in the Forest Service Handbook (FSH 2509.22). Potential impacts from road activities include sediment delivery from road surfaces and culvert replacements, and fish passage barriers at stream crossings. Miles of proposed road construction by alternative are shown in Table 3-16.

**Table 3-16**  
**Miles of Proposed Road Construction by Watershed and Alternative**

<b>Watershed</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>	<b>Alt. 5</b>	<b>Alt. 6</b>
Unnamed (00)	0.0	0.0	0.2	0	0
Licking Creek (08)	0.3	0.4	0.6	0	0
Unnamed (13)	0.1	0.1	0.0	0	0
Calamity Creek (14)	0.6	1.0	1.0	0	0
Unnamed (19)	0.0	0.0	1.8	0	0
Marble Creek (20)	0.2	0.2	0.9	0	0
Easy Creek (21)	0.3	0.4	1.0	0	0
<b>Total Miles<sup>1</sup></b>	<b>1.5</b>	<b>2.1</b>	<b>5.5</b>	<b>0</b>	<b>0</b>

<sup>1</sup> Total miles may not exactly match totals shown elsewhere, due to rounding.

Source: J. Llanos, 2002, 2003

## Road Erosion

Roads would be designed with adequate road drainage features, according to BMPs, to prevent surface erosion of the road prism or sediment delivery directly into streams. Roads would be maintained during their use to protect the running surface and keep drainage features functional. Upon conclusion of timber harvest and associated silvicultural activities, all new roads would be closed and stormproofed (physical barriers installed and drainage pipes removed). (See additional discussion under Transportation in Chapter 3 and in the road cards, Appendix B of the Draft EIS).

Tongass water quality effectiveness monitoring in 2000 included turbidity measurements for culvert placement. These were done at Shelter Cove and Shoal Cove, usually less than 3 hours

## Direct and Indirect Effects of Roads

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following road construction (TNF Annual Monitoring & Evaluation Report for Fiscal Year 2000, pg. 2-100). Water quality criteria for turbidity were met at all of the sites on the Ketchikan-Misty Fiords Ranger District. This indicated that BMPs to prevent water quality degradation from erosion associated with new road construction were effective.

#### Fish Passage

Currently, National Forest System road construction and maintenance is debated nationally. On the Tongass, past road construction practices have impaired fish passage. The Tongass Land Management Plan 2001 Monitoring Report found that approximately 34 percent of existing Class I, and 71 percent of existing Class II fish habitat crossings do not meet current fish passage standards, although in many cases fish are passing through under some conditions. In recent years, the Tongass National Forest has begun a field survey effort to characterize all road crossings and identify passage deficiencies (Annual Monitoring & Evaluation Report for Fiscal Year 2001). New fish passage construction methods are expected to successfully provide fish passage at new culvert installations.

Three existing crossings on Class II streams would be reconstructed (two bridges and one culvert), under Alternatives 2, 3, 4, and 5, and designed to allow fish passage. Construction or reconstruction of roads would maintain or restore fish passage.

No new crossings of fish habitat (Class I or Class II stream) are proposed under any of the alternatives. One new Class III stream crossing is proposed for Alternative 3. Two new Class III stream crossings and two new Class IV stream crossings are proposed for Alternative 4.

#### Instream Timing Restrictions

In-stream construction is restricted on Class I streams to a specific time of the year to protect critical freshwater life phases of Pacific salmon. A Class I designation is given to streams and lakes that contain "anadromous or adfluvial fish habitat." (Adfluvial habitat is a tributary stream that provides spawning and juvenile rearing habitat for salmonids that grow to maturity in a lake and then return to spawn in the tributary.) Road construction and reconstruction includes some timing restrictions to Class I streams that support known populations of Pacific salmon. Timing restrictions may also apply to Class II and III streams, when in-stream road construction is likely to have an immediate impact on Class I habitat downstream of the road construction activity. Timing windows, when in-stream construction is permitted, coincide with absence of spawning adult salmon, salmon eggs, or larval salmon in the gravel (Table 3-17). The road cards specify where timing restrictions apply to all existing and proposed roads in the project area.

These timing restrictions limit activities when salmon are expected to be in the stream. Timing windows can be altered, should stream-specific information be identified for the project area that shows salmon are present during time periods different than those described in the generic timing windows.

Table 3-17  
Timing Windows for In-stream Road Construction

Species	Timing Window
Pink / Chum	June 1 to August 3
Coho	June 15 to September 1

Source: FSH 2090.21 Aquatic Habitat Management Handbook, 2002

#### Effects by Alternative

##### Alternative 1

No new harvest or road building would occur in this alternative. Any new impacts to fish habitat or water quality would be caused by naturally occurring disturbances. The No-action Alternative is presented as a baseline of comparison for the action alternatives.

## **Items Common to All Action Alternatives**

Potential effects on downstream water quality were identified as an issue, due to the level of previous timber harvest (and riparian harvest) in the project area. However, because most of the stream channels in the project area are bedrock-controlled and resistant to erosion, risks of sediment transport are inherently low. Forest Plan Standards and Guidelines, and Best Management Practices for road placement and construction, (reconstruction only in Alternative 5), were applied to all action alternatives; these are designed to minimize sediment transport from upland areas. During alternative development, several units were dropped for watershed and other concerns, which further reduced the overall level of risk.

Anadromous fish (salmon) habitat within the Licking Creek project area is minimal, and the project area watersheds are, generally, unproductive for these species. With the application of Forest Plan Standards and Guidelines, including those for riparian areas, risks to freshwater or marine resources would be minimized. None of the action alternatives are anticipated to adversely affect Essential Fish Habitat. Recreational fishing access would be unaffected, as all new roads would be closed after timber harvest and associated silvicultural activities. Three existing crossings on Class II streams would be reconstructed (two bridges and one culvert), under Alternatives 2, 3, 4, and 5, and designed to allow fish passage.

Classified roads built in Alternatives 2, 3 and 4 would remain open and be maintained at Maintenance Level 2 until silvicultural activities are completed. (No new roads would be built under Alternatives 5 or 6.) At that time, new classified roads would be closed, culverts would be removed, and the roads would be placed into storage in as maintenance-free a condition as possible. Temporary roads would also be closed after the timber sale is completed, including removal of culverts and restoring the channel profile at the stream crossing so that the banks slope at a minimum of 1.5 to 1 ratio. (See additional discussion under Transportation, Chapter 3, and the road cards, Appendix B of the Draft EIS.)

## **Alternative 2**

Alternative 2 was designed to address concerns for cumulative effects of timber harvest on fish and water resources. (The project planning record contains a list of units that were dropped during alternative development and the reasons for their deletion.) This alternative proposes the least timber harvest and new road construction, and no new stream crossings. Only one acre of harvest is proposed in Unnamed 19 watershed, which has the highest percentage of cumulative harvest and only one acre of harvest is proposed in Unnamed 13 watershed.

## **Alternative 3**

Alternative 3 ranks intermediate among the action alternatives in the potential to adversely affect fish and water resources. This alternative proposes more timber harvest and new road construction than Alternative 2, and one new Class III stream crossing, in Calamity Creek watershed to access Unit 31. This crossing would not require timing restrictions, as the anadromous habitat is over 2 miles downstream from this crossing. Thirty-four acres of harvest are proposed in Unnamed 19 watershed. Only one acre of harvest is proposed in Unnamed 13 watershed. Calamity Creek watershed would experience the most harvest in this alternative; however, none of the harvest would cause a reduction in fish habitat or complexity.

## **Alternative 4**

Of the action alternatives, Alternative 4 would have the greatest potential effect on fish and water resources. This alternative proposes the most timber harvest and new road construction, and two new Class III stream crossings - one in Calamity Creek watershed to access Unit 31, and one in Unnamed 19 watershed. Under this alternative, timber harvest was increased (over that proposed in Alternative 3) in all watersheds except Calamity Creek. Harvest of several units, totaling approximately 147 acres, is proposed in Unnamed 19 watershed. Appropriate Standards and Guidelines riparian buffers would be applied. This alternative also proposes two new Class IV stream crossings in the Marble Creek watershed to access Unit 67.

## **Alternative 5**

Of the action alternatives, Alternative 5 would have the second-greatest potential effect on fish



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and water resources, after Alternative 4. Although this alternative would harvest nearly as much timber as Alternative 4, it would employ more helicopter logging, which produces much less ground disturbance than conventional cable logging. Fewer acres would be harvested in Unnamed 19 watershed (61 acres) in this alternative than in Alternative 4, and no new road construction or new stream crossings would occur.

#### Alternative 6

Of the action alternatives, Alternative 6 would have the lowest potential effect on fish and water resources. This alternative has a timber harvest level similar to Alternative 2. It proposes no new road construction, reconstruction, or stream crossings. Harvest of Unit 50 in Unnamed 19 watershed is proposed.

#### Cumulative Effects

#### Other Scheduled Timber Harvest

The Madder Timber Sale was analyzed in the Sea Level Timber Sale EIS and is scheduled to be sold. The decision for the Mop Point/91 Knot EA was signed in 2002. The road miles and timber harvest for the cumulative effects of the existing conditions, the Madder timber sale and the Mop Point/91 Knot timber sale actions are shown in Table 3-19 and Table 3-20.

One adjustment was made in the Madder Timber Sale roads design. About 0.8 mile of new road is scheduled to be built in Unnamed 13 watershed. This road, as planned in the Sea Level Final EIS, crossed a Class II stream four times. During layout, the road location was adjusted to avoid crossing any fish-bearing streams.

Table 3-18

Timber Harvest and Road Construction-Madder and Mop Point/91 Knot Timber Sales Actions in the Licking Creek Project Area Watersheds<sup>1</sup>

Watershed Name	Size (acres)	Madder TS Planned <sup>1</sup> Roads (miles)	Mop Point/91 Knot Planned <sup>1</sup> Roads (miles)	Madder TS Planned <sup>2</sup> Timber Harvest (acres)	Mop Point/91 Knot Planned <sup>2</sup> Timber Harvest (acres)
Unnamed (00)	688	0.1	0.1	32	9
Licking Creek (08)	4,107	0	0	0	0
Unnamed (13)	573	1.5	0	59	0
Calamity Creek (14)	4,231	1.2	0	45	0
Unnamed (19)	829	0.8	0	73	0
Marble Creek (20)	3,721	0.5	0	40	0
Easy Creek (21)	3,871	0.5	0	0	0
<b>Total<sup>1</sup></b>	<b>18,020</b>	<b>4.6</b>	<b>0.1</b>	<b>249</b>	<b>9</b>

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Madder and Mop Pt./91 Knot Timber Sale actions are scheduled to be sold. Acres by watershed are approximate.

Source: R. Sainz, 2002

#### Cumulative Effects of Timber Harvest and Road Construction

A method to establish quantitative thresholds for cumulative effects has not yet been developed for watersheds on the Tongass National Forest. Accurate analysis of cumulative effects requires long-term study of interactive landscape processes; the kind of quantitative knowledge and published literature that results from a long-term study is not currently available at the project scale for the Alaska Region. Without a literature-based method for describing the natural range of hydrologic and geomorphic variability in the watersheds of the Licking Creek project area, this analysis relies upon the guidance provided by the Forest Plan in the form of management Standards and Guidelines to minimize management-related cumulative effects.

The following tables illustrate the combined effects of existing harvest, the scheduled Madder and Mop Point/91 Knot Timber Sales, and the Licking Creek actions by alternative. These are effects within the entire watersheds (which include areas outside of the project area).



Table 3-19  
Cumulative Timber Harvest in Watersheds<sup>1</sup> by Alternative

Watershed Name	Size (acres)	Cumulative Timber Harvest (acres)					
		Alt. 1 <sup>2</sup>	Alt. 2 <sup>3</sup>	Alt. 3 <sup>3</sup>	Alt. 4 <sup>3</sup>	Alt. 5 <sup>3</sup>	Alt. 6 <sup>3</sup>
Unnamed (00)	688	111	111	111	152	141	135
Licking Creek (08)	4,107	588	673	779	781	841	700
Unnamed (13)	573	196	197	197	208	208	197
Calamity Creek (14)	4,231	527	616	740	702	710	527
Unnamed (19)	829	427	428	461	574	488	445
Marble Creek (20)	3,721	1,086	1,133	1,140	1,209	1,216	1,112
Easy Creek (21)	3,871	1,201	1,231	1,281	1,300	1,297	1,234
<b>Total</b>	<b>18,020</b>	<b>4,136</b>	<b>4,389</b>	<b>4,709</b>	<b>4,926</b>	<b>4,901</b>	<b>4,350</b>

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Timber harvest from 1954 to 1996 and timber harvest scheduled under Madder and Mop Point/91 Knot timber sales.

<sup>3</sup> Total of existing, Madder and Mop Point/91 Knot units and harvest units proposed under each alternative.

Source: R. Sainz, 2002, 2003

The Direct and Indirect Cumulative Effects analysis found in the Forest Plan Final EIS (page 3-56) judged that watersheds already heavily disturbed by previous management would not be recovered in 100 years, and that current practices (pre-Forest Plan) would continue to degrade some habitats. A Fish/Riparian Panel was completed in 1995, in which the Forest Plan panelists assumed that more miles of road would be located in higher elevations on less-stable terrain, and harvest would occur on less-stable areas, as compared to historical harvest and road construction. All panelists agreed that if this scenario were true, then the result would be a greater likelihood of hillslope failure, erosion of fine sediment from road surfaces, and capture and re-routing of natural drainage. All of the watersheds within the project area contain existing road and harvest. To address cumulative effect concerns, measures to avoid additional impacts to aquatic resources in the project area were applied:

- Units were designed to consider the proximity of streams and access from the existing road system.
- Forest Plan Standards and Guidelines and applicable BMPs, to reduce the potential for adverse effects, would be fully applied.

A large portion of the total unit acreage consists of deferral acreage for high value marten habitat, which could be located during unit layout to accommodate resource protection. A large portion of the unit acreage would also be reserved from timber harvest to address soils and karst concerns.

### 3 Environment and Effects

Table 3-20  
Cumulative Road Miles in Watersheds<sup>1</sup> by Alternative

Watershed Name	Size (acres)	Cumulative Road Miles					
		Alt. 1 <sup>2</sup>	Alt. 2 <sup>3</sup>	Alt. 3 <sup>3</sup>	Alt. 4 <sup>3</sup>	Alt. 5 <sup>3</sup>	Alt. 6 <sup>3</sup>
Unnamed (00)	688	3.8	3.8	3.8	4.0	3.8	3.8
Licking Creek (08)	4,107	8.2	8.5	8.6	8.8	8.2	8.2
Unnamed (13)	573	2.7	2.8	2.8	2.7	2.7	2.7
Calamity Creek (14)	4,231	4.4	7.7	8.1	5.7	7.1	4.4
Unnamed (19)	829	5.3	5.3	5.3	7.1	5.3	5.3
Marble Creek (20)	3,721	8.1	9.7	9.7	10.4	9.5	8.1
Easy Creek (21)	3,871	10.3	10.6	10.7	11.3	10.3	10.3
<b>Total</b>	<b>18,020</b>	<b>42.8</b>	<b>48.4</b>	<b>49.0</b>	<b>50.0</b>	<b>46.9</b>	<b>42.8</b>

<sup>1</sup> Watersheds include areas outside of the project area; consequently, totals will be larger than those for the project area.

<sup>2</sup> Existing roads and road construction scheduled under Madder and Mop Point/91 Knot timber sales.

<sup>3</sup> Total of existing roads, Madder and Mop Point/91 Knot roads, road construction and road reconstruction proposed under each alternative.

Source: R. Sainz, 2002, 2003

#### Alternative 1

The existing conditions in the project area for stream channel conditions, fish habitat, and riparian management areas would continue. Timber harvest and road construction for the Madder and Mop Point/91 Knot timber sales will occur in the foreseeable future. This will increase recent timber harvest and road miles in the project area watersheds (Tables 3-18 and 3-19). The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. Application of Forest Plan Standards and Guidelines, including no-cut riparian buffers, and Best Management Practices for road construction, would protect fish habitats. Riparian areas previously harvested would continue to regrow, and over time would be restored to pre-harvest levels.

#### Alternatives 2, 3, 4, 5, and 6

Timber harvest and road construction for the Madder and Mop Point/91 Knot timber sales will occur in the foreseeable future. Combined with the Licking Creek alternatives, this would increase the total timber harvest and road miles in the project area watersheds (Tables 3-18 and 3-19). The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. The cumulative effects of each alternative on fish habitat and water quality would be similar to those described above. Application of Forest Plan Standards and Guidelines, including no-cut riparian buffers, and Best Management Practices for road construction, would protect fish habitats. Riparian areas previously harvested would continue to regrow, and over time would be restored to pre-harvest levels.

#### Essential Fish Habitat Assessment

An agreement between the National Marine Fisheries Service and the Forest Service, dated August 25, 2000, described what factors are to be considered in an assessment of potential effects on Essential Fish Habitat. These include 1) a description of the proposed action (see Chapter 2, Alternatives Considered in Detail); 2) an analysis of individual and cumulative effects of the action on Essential Fish Habitat, the managed species, and associated species such as major prey species, including affected life histories; 3) the Forest Service's assessment regarding effects on Essential Fish Habitat; and 4) a discussion of proposed mitigation, if applicable. All of the environmental analysis in the Watershed and Fish Habitat and Soils sections supports this assessment, which summarizes the effects on Essential Fish Habitat.

Potential effects of timber harvest and road building on Essential Fish Habitat may be degraded water quality and altered physical stream habitat. Degraded water quality may include increased water temperature or suspended sediment. Potential changes in physical habitat may

include reduced pool volume, due to filling from sedimentation and changes in composition of the substrate. Pool volume is important to rearing and over-wintering of juvenile coho. Increased fines in the substrate can reduce survival of salmon eggs and change the assemblages of aquatic insects used by fish for food.

The Forest Service has determined that this project *May Adversely Affect* Essential Fish Habitat. The National Marine Fisheries Service reviewed the Draft EIS and EFH Assessment. They concurred that the project may adversely affect EFH, and that the appropriate measures to minimize those effects are use of the Tongass Land Management Plan Standards and Guidelines (including 100 foot minimum buffers on all anadromous and high value resident fish streams) and Best Management Practices. Formal essential fish habitat consultation is complete in accordance with the agreement between the National Marine Fisheries Service and the Forest Service. (A copy of the official response from the National Marine Fisheries Service is in Appendix B.)

We believe the risk to Essential Fish Habitat is minimal with this timber sale, as all proposed harvest units are upstream and away from salmon streams. All structures (bridges, stringer bridges, culverts) crossing Class I fish habitat in the Licking Creek Timber Sale project are already in place, and currently provide passage for juvenile and adult salmon in accordance with the agreed-upon passage standards (Forest Plan Final EIS). No additional mitigation measures (beyond Standards and Guidelines) were recommended.

## Issue 4: Transportation

**Issue Statement: An open road system should be managed to meet our current and future capability for road maintenance. Economics of building new roads must be considered.**

The Forest Service Transportation Policy (FSM 7700) establishes requirements for roads analysis when planning to construct, reconstruct or close roads on National Forest System lands. The Tongass National Forest has prepared this environmental impact statement to be consistent with the Forest Service Transportation Policy. The Licking Creek project Roads Analysis is located in the project planning record.

Transportation systems in the project vicinity can be broken into two categories: Forest Service roads, and log transfer facilities (LTFs). Three other transportation categories, 1) State and municipal roads (2) private roads and (3) public transportation facilities such as State highways, ferry docks, or airports, do not occur in the vicinity of the Licking Creek project area. Roads are described below; log transfer facilities are discussed in the Log Transfer Facilities and Related Sites section.

### Affected Environment

National Forest System roads are designed to varying standards depending on use. Arterial and collector roads are mainline roads designed and maintained for prolonged use by passenger vehicles. They generally require higher construction standards and heavier financial investment, but can be built to lower standards initially and upgraded as use intensifies. Local roads are generally single-purpose roads, not designed or maintained to accommodate passenger vehicles. They are usually built to lower design standards and cost less than arterial and collector roads.

National Forest System roads are classified, based on current or anticipated use, into one of three maintenance levels. Maintenance levels incorporate traffic service levels, as indicated in the following definitions.

- Maintenance Level 1 - Roads are closed by barrier, bridge removal or organic encroachment and are monitored for resource protection. Basic custodial maintenance is performed to perpetuate the road and to facilitate future management activities. As used in this EIS, road "closure" includes the removal of drainage pipes and stormproofing ditches and drainage features, so that ongoing maintenance is not needed. This work would be done after the harvest units were recertified as regenerated, usually within 3 years after completion of the timber harvest. Some road segments may be closed immediately after timber harvest is concluded. (See also the road cards, Appendix B of the Draft EIS).
- Maintenance Level 2 - Roads are maintained for high-clearance vehicles and monitored for resource protection. Traffic is normally minor, usually consisting of administrative or recreational uses.
- Maintenance Level 3 - Roads are maintained for travel by a prudent driver in a standard passenger vehicle and are subject to the provisions of the Highway Safety Act. Road use is by administrative and passenger vehicles, and by logging trucks.



None of the existing National Forest System roads within the Licking Creek project area connect to other existing road systems on Revillagigedo Island. Except for 5.9 miles of road that the U.S. Coast Guard maintains at Maintenance Level 3, all roads in the project area are maintained at Maintenance Level 1 or 2. These single-lane, rough-rock roads are primarily designed for heavy, off-highway logging trucks to implement silvicultural activities on the National Forest. Approximately 4.1 miles of additional road will be constructed for the Madder Timber Sale, to be sold by 2004. Roads constructed for the Madder Timber Sale will be constructed at Maintenance Level 2, maintained at this level until silvicultural activities are completed, and then closed (Maintenance Level 1). There are no State or municipal roads, private roads, or public transportation facility roads within the project area.

## Environmental Consequences

### Transportation System Costs

The effects of the transportation system on other resources are considered in the specific resource sections (Fisheries, Subsistence, Wildlife, Recreation, and Scenery). In this section, we focus on the effects of each alternative on the transportation system, and discuss post-project access management.

All new roads proposed for each alternative would be constructed at Maintenance Level 2. After completion of silvicultural activities, they would be maintained at Maintenance Level 1. Maintenance Level 1 roads are closed by barrier, bridge removal or by organic encroachment and are monitored for resource protection. Basic custodial maintenance is performed to perpetuate the road and to facilitate future management activities. Roads are built to Forest Service Specifications and BMPs (Table 3-21; see also the maps for Alternatives 2 through 4, Chapter 2). Road development patterns are similar from one alternative to another due to the location of the resource being used, terrain characteristics, and development costs. Variations in road segments occur due to differences in routes and location of log transfer facilities. Roads are located to minimize disturbance on the land, yet provide access to resources. Thus, road locations generally follow routes of favorable terrain where practical.

Table 3-21  
Proposed Road Construction Lengths and Costs

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Classified Road</b>					
Miles	0.67	1.06	3.13	0	0
Cost	\$127,300	\$201,400	\$594,700	0	0
<b>Temporary Road</b>					
Miles	0.83	1.11	2.36	0	0
Cost	\$78,850	\$105,450	\$224,200	0	0
<b>Total Miles of New Construction</b>	<b>1.50</b>	<b>2.17</b>	<b>5.49</b>	<b>0</b>	<b>0</b>
<b>Reconstructed Road</b>					
Miles	4.11	4.11	1.65	4.11	0
Cost	\$156,000	\$156,000	\$90,000	\$156,000	0
<b>Pre-Haul Maintenance</b>					
Miles	21.43	23.06	21.10	23.06	16.67
Cost <sup>1</sup>	\$170,000	\$170,000	\$170,000	\$170,000	\$140,000
<b>Total Cost</b>	<b>\$532,150</b>	<b>\$632,850</b>	<b>\$1,078,900</b>	<b>\$326,000</b>	<b>\$140,000</b>

<sup>1</sup> Cost is estimated and not differentiated between alternatives 2 through 5 at this time. Alternative 6 does not use a large section of existing roads.

Source: R. Emley, D. Fletcher 2002, 2003

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Classified roads are part of the permanent road system, and built to a higher road construction standard than temporary roads. Temporary roads (usually short spurs) are built for harvest entry and are closed when the sale is completed. Temporary roads are planned for use in a single timber sale, and are not to be used again. Infrequently, a temporary road is used as a beginning point for a classified road in a second timber sale; in this instance, the road is re-built to classified road standards. This is an unplanned event, but may be used to conserve resources.

A designed road system reflects a balancing of various economic and resource considerations. The available timber volume must be of adequate stumpage value to cover the costs of road construction and maintenance. Conversely, roads can shorten the yarding distances for cable and shovel logging systems, thus reducing some costs and some resource impacts of the sale. Classified roads also provide access for future sale management opportunities.

## Access Management

After the completion of harvest activities, road access is managed to prevent damage to the roadway and to meet other resource objectives, while maintaining access for public uses and timber management-related activities. The Ketchikan-Misty Fiords Ranger District's access management program will include public and agency involvement, and interagency evaluation of road management objectives.

The following points were used to develop access management strategies for the Licking Creek project area:

- Meet Forest Plan Standards and Guidelines, while addressing the economic and social needs of the communities and residents associated with the project, and meeting administrative needs.
- In general, "eliminate" rather than "prohibit" road use (as defined below). Formal CFR road closures prohibiting use are not currently planned for any roads, but could be required in the future if need is determined.

The following access management categories were used in the action alternatives.

- Encourage - Motor vehicle use is encouraged by appropriate signing, public notification, and active maintenance of the road prism.
- Eliminate - Motor vehicle use is eliminated by physically blocking the road. Where prescribed for long-term intermittent roads, this strategy is achieved by placement of impassable barricades at road entrances. On short-term roads, removal of drainage structures effectively blocks vehicle traffic.
- Prohibit - Motor vehicle use is prohibited by a road order (CFR closure). Implementation of this strategy on remote road systems may require the installation of gates, in addition to public notification and appropriate signing.
- Prohibit Seasonally - Road is closed to motor vehicle use at times during the normal operating year. For all alternatives, seasonal prohibitions will be used as necessary to mitigate impacts to wildlife and subsistence resources (e.g., closure during either sex deer hunting season). Administrative and permitted use of the roads will continue during closure periods, but only for specific permitted uses. Seasonal closures may be used in combination with cooperative efforts with fish and game protection agencies.

Access management strategies for specific roads in the project area vary with each alternative (Table 3-22). These are described in detail in the road cards (Appendix B of the Draft EIS) under Road Management Objectives.

**Table 3-22**  
**Proposed Access Management for Roads to Implement the Licking Creek Project**

Road Number	Road Miles	Alt. 1 (Current Status)	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
8400000 (E)	7.84	Encourage	Encourage	Encourage	Encourage	Encourage	Encourage
8400420 (E)	1.41	Encourage	Encourage	Encourage	Encourage	Encourage	Encourage
8400450 (E)	1.46	Prohibit Seasonally	N/A	Prohibit Seasonally	Prohibit Seasonally	Prohibit Seasonally	Prohibit Seasonally
8442000	0.88 (E) 1.37 (R)	Encourage Currently Eliminated	Eliminate Eliminate	Eliminate Eliminate	Eliminate Eliminate	Eliminate Eliminate	N/A
8444000	3.14 (E) (Alts 2,3,4,5) 0.46 (E) (Alt 6)	Encourage	Eliminate	Eliminate	Eliminate	Eliminate	Eliminate
	2.74 (R) (Alts 2,3,5) 0.29 (R) (Alt 4)	Currently Eliminated	Eliminate	Eliminate	Eliminate	Eliminate	N/A
8444050 (E)	0.81	Currently Eliminated	N/A	N/A	Eliminate	N/A	N/A
8446000 (E)	7.77 (Alts 2,3,5) 5.50 (Alt 4, 6)	Encourage	Encourage	Encourage	Encourage	Encourage	Encourage
8446100 (E)	0.55	Encourage	Prohibit seasonally	Prohibit seasonally	N/A	Prohibit Seasonally	N/A
8400470 (N)	0.58	N/A	N/A	N/A	Eliminate	N/A	N/A
8400451 (N)	0.24	N/A	N/A	N/A	Eliminate	N/A	N/A
8444051 (N)	0.37	N/A	N/A	N/A	Eliminate	N/A	N/A
8444060 (N)	0.68	N/A	N/A	N/A	Eliminate	N/A	N/A
8444200 (N)	0.22 (Alt 2) 0.61 (Alts 3,4)	N/A	Eliminate	Eliminate	Eliminate	N/A	N/A
8444300 (N)	0.18	N/A	Eliminate	Eliminate	N/A	N/A	N/A
8446150 (N)	0.42	N/A	N/A	N/A	Eliminate	N/A	N/A
8400445 (N)	0.27	N/A	Eliminate	Eliminate	Eliminate	N/A	N/A

N/A Not applicable to this Alternative

(N) New Construction on this Alternative

(R) Reconstruction on this Alternative

(E) Road Requiring Pre-haul Maintenance on this Alternative

Source: R. Emley, 2002, 2003

The amount of road system necessary to implement sound multiple-use management of National Forest System lands is based on the Forest Plan and identified community needs. The activities proposed for road construction and maintenance in this project respond to Forest Plan goals and objectives to protect water, soil, fish, and other resources. The amount of road construction (Table 3-22), when combined with other proposed roads Forest-wide, is well within the Forest Plan objectives. All new road location and design would meet or exceed the

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## Direct and Indirect Effects

Forest Plan Standards and Guidelines (Forest Plan, page 4-104 to 4-110). Stream crossing structures have been analyzed for safety and resource concerns.

Each alternative in the Licking Creek project would affect the road analysis process differently, depending on the miles of open road that would require maintenance and monitoring of ecological effects. All new roads are proposed to be eliminated after completion of timber harvest and silvicultural activities (which includes recertification of the units as regenerated, usually 3 years after harvest).

### Alternative 1

The existing road conditions would continue, including the current maintenance schedule, under this alternative. Many of the project area roads are used year-round, unless blocked by snow, by Coast Guard personnel. The roads are also used seasonally by hunters and recreationists, who walk or bring motorized vehicles such as ORVs. Most of the project area was designated for Timber Production in the Forest Plan, and it is assumed that harvest activities will occur at some time in the future. The road cards list current conditions that need to be addressed before they deteriorate further, causing possible resource damage and affecting stream and fisheries resources. Road segments not used for the Madder Timber Sale would be on a delayed schedule for maintenance. Road density and number of stream crossings would remain the same.

### Items Common to Action Alternatives 2, 3, and 4

New roads would be constructed as Objective Maintenance Level 2. After completion of the timber sale (and silvicultural activities), the roads would be closed by barrier, bridge removal, or vegetation re-growth, and monitored for resource protection. Basic custodial maintenance is performed to perpetuate the road and facilitate future management activities such as timber harvest and recreation.

Road construction could affect hunter success and increase legal and illegal hunting. Additional recreation opportunities would be created by providing new access to forested areas. All three alternatives would maintain the road density below the recommended 0.7 to 1.0 mile per square mile, and minimally reduce deer and wolf habitat.

There would be no adverse effect to fish habitat from road construction, road reconstruction, and related activities. There would be no new fish stream crossings of anadromous fish habitat. Under these alternatives, two bridge crossings of Class II streams and one culvert would be reconstructed to maintain and restore fish passage. All structures would provide juvenile and adult salmonid passage in accordance with the Forest Plan. There would be no detectable effects on managed fish species due to road construction, reconstruction, or related activities.

New road locations were designed to avoid impacts to high-vulnerability karst.

### Alternative 2

The least amount of road construction, 1.5 miles, would occur under this alternative. The 4.1 miles of reconstruction under this alternative would repair road segments not used in the Madder Timber Sale.

### Alternative 3

Approximately 2.2 miles of new road would be constructed under this alternative. The 4.1 miles of reconstruction under this alternative would repair road segments not used in the Madder Timber Sale.

### Alternative 4

Under this alternative, the largest number of new road construction miles, 5.5 miles, would occur. The 1.65 miles of reconstruction under this alternative would repair road segments not used in the Madder Timber Sale.



## Alternative 5

No new roads would be constructed under this alternative. The 4.1 miles of reconstruction under this alternative would repair road segments not used in the Madder Timber Sale. Two bridge crossings of Class II streams and one culvert would be reconstructed. All structures would provide juvenile and adult salmonid passage in accordance with the Forest Plan. There would be no detectable effects on managed fish species from road reconstruction activities. Road density and number of stream crossings would remain the same.

## Alternative 6

No new roads would be constructed under this alternative, and no road reconstruction would occur. Road density and number of stream crossings would remain the same. As in the No-action Alternative, road segments not used for the Madder Timber Sale would be on a delayed schedule for maintenance. This road repair and maintenance would need to be done in the near future and would have elevated costs due to the additional mobilization and increased unit costs.

## Alternative 1

No activity in the Licking Creek project area would take place under this alternative. The existing road conditions would continue, and road segments not used for the Madder Timber Sale would not be repaired through sale contracts, and would be on a delayed schedule for maintenance. Approximately 36 miles of existing road are in the project area. Approximately 4.1 miles of new road will be built for the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, raising the total road miles in the project area to approximately 40.2 miles. (Refer to the Alternative 1 map, Chapter 2.)

Existing roads would remain at the current maintenance level. All new road construction would be Maintenance Level 1 after completion of harvest and silvicultural activities. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future.

## Items Common to All Action Alternatives

Existing roads not used in the alternative would remain at the current maintenance level. All new road construction or reconstruction would be Maintenance Level 1 after completion of harvest and silvicultural activities. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future.

## Alternative 2

Approximately 4.1 miles of closed road would be reconstructed, and approximately 1.5 miles of new road constructed in this alternative. Together with the 36 miles of existing road, construction of 4.1 miles under the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, the total road miles in the project area would be approximately 45.8 miles. (Refer to the Alternative 2 map, Chapter 2, and the road cards, Appendix B of the Draft EIS.)

## Alternative 3

Approximately 4.1 miles of closed road would be reconstructed, and approximately 2.2 miles of new road constructed in this alternative. Together with the 36 miles of existing road, construction of 4.1 miles under the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, the total road miles in the project area would be approximately 46.5 miles. (Refer to the Alternative 3 map, Chapter 2, and the road cards, Appendix B of the Draft EIS.)

## Alternative 4

Approximately 1.65 miles of closed road would be reconstructed, and approximately 5.5 miles of new road constructed in this alternative. Together with the 36 miles of existing road, construction of 4.1 miles under the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, the total road miles in the project area would be approximately 47.35 miles. (Refer to the Alternative 4 map, Chapter 2, and the road cards, Appendix B of the Draft EIS.)

## Cumulative Effects

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## **Alternative 5**

Approximately 4.1 miles of closed road would be reconstructed, but no new road constructed in this alternative. Together with the 36 miles of existing road, the construction of 4.1 miles under the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, the total road miles in the project area would be approximately 44.3 miles. (Refer to the Alternative 5 map, Chapter 2, and the road cards, Appendix B of the Draft EIS.)

## **Alternative 6**

In this alternative, no new roads would be built and no road reconstruction would occur. Approximately 36 miles of existing road are in the project area. Approximately 4.1 miles of new road will be built for the Madder Timber Sale, and 0.1 mile for the Mop Point Timber Sale, raising the total road miles in the project area to approximately 40.2 miles. (Refer to the Alternative 6 map, Chapter 2, and the road cards, Appendix B of the Draft EIS.)

## Biodiversity and Old Growth

National Forest Management Act (NFMA) regulations (36 CFR 219) define biodiversity as the distribution and abundance of different plant and animal communities and species, and require that fish and wildlife habitats be managed to maintain those species in the National Forests (36 CFR 219.19). The 1997 Tongass Land and Resource Management Plan (Forest Plan) was designed to maintain viable populations of fish and wildlife across the Tongass National Forest for at least 100 years. Old-growth forest habitat plays a key role in maintaining viable populations.

### Affected Environment

#### Old-growth Forest

Old-growth forests of the Tongass contain a diverse mixture of plant and animal species and habitats. The diversity of landforms and drainage patterns influence vegetative cover. Muskegs are characteristic of poorly drained soils, conifer forests of well-drained soils, and sparsely forested areas of intermediate drainage. At a smaller scale, patches of poorly drained, non-forested areas can be found within old-growth stands (Forest Plan Final EIS). Refer to the Silviculture/Timber Management Section and Wetlands/Floodplains section for discussions on forest composition.

Old growth contains a mosaic of older and younger trees with small, dispersed openings, dynamically changing, yet remaining stable as a forested ecosystem (Bormann and Likens 1979, Alaback 1988, Schoen et al. 1988, Franklin 1990). The combination of a dense canopy with scattered small openings (typically 20 to 40 feet across) allows forage to grow under the openings. The large limbs and overlapping branches within the canopy intercept snowfall. Stands that develop after clearcut logging of old growth are even-aged (Harris and Farr 1974) and contain a higher percentage of Sitka spruce and a lower percentage of cedars. Clearcutting often results in concentrated, large-scale openings where nearly all trees are felled; in natural disturbances many trees remain standing or partially standing (Hansen et al. 1991).

#### Old-growth Reserves

To maintain wildlife habitat, the Forest Service established a system of old-growth forest habitat, which includes large, medium, and small Old-growth Reserves (OGRs) to maintain the integrity of the old-growth ecosystem. These OGRs, along with other non-development LUDs, and beach/estuary and riparian corridors provide a reasonable assurance of protecting adequate habitat to maintain viable fish and wildlife populations (Forest Plan). This system is designed to minimize threats to biodiversity while allowing timber harvest in suitable land use designations (LUDs). Small OGRs are designated in Value Comparison Units (VCUs) where non-development LUDs alone do not meet the Forest Plan's Old Growth criteria (Forest Plan, Appendix K). These small OGRs are designed to maintain forest connectivity between larger OGRs and non-development LUDs. They can be re-evaluated during project analysis, but must include the size, spacing, and habitat composition of OGR criteria (Forest Plan, p.3-82). If small OGRs, as initially mapped in the Forest Plan, fail to meet these criteria, an interagency review is made to recommend changes in their locations and/or boundaries. This is done as part of project planning. An interagency team of biologists representing the Forest Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game cooperatively evaluate the small OGRs in and adjacent to the proposed project areas, and provide a consensus biological recommendation on their design. Beach fringe forest and riparian buffers act as migration corridors between OGRs. Where this has been compromised by past timber harvest or other factors, the Forest Service should maintain additional old-growth habitat to facilitate interaction among individuals and aid dispersal.

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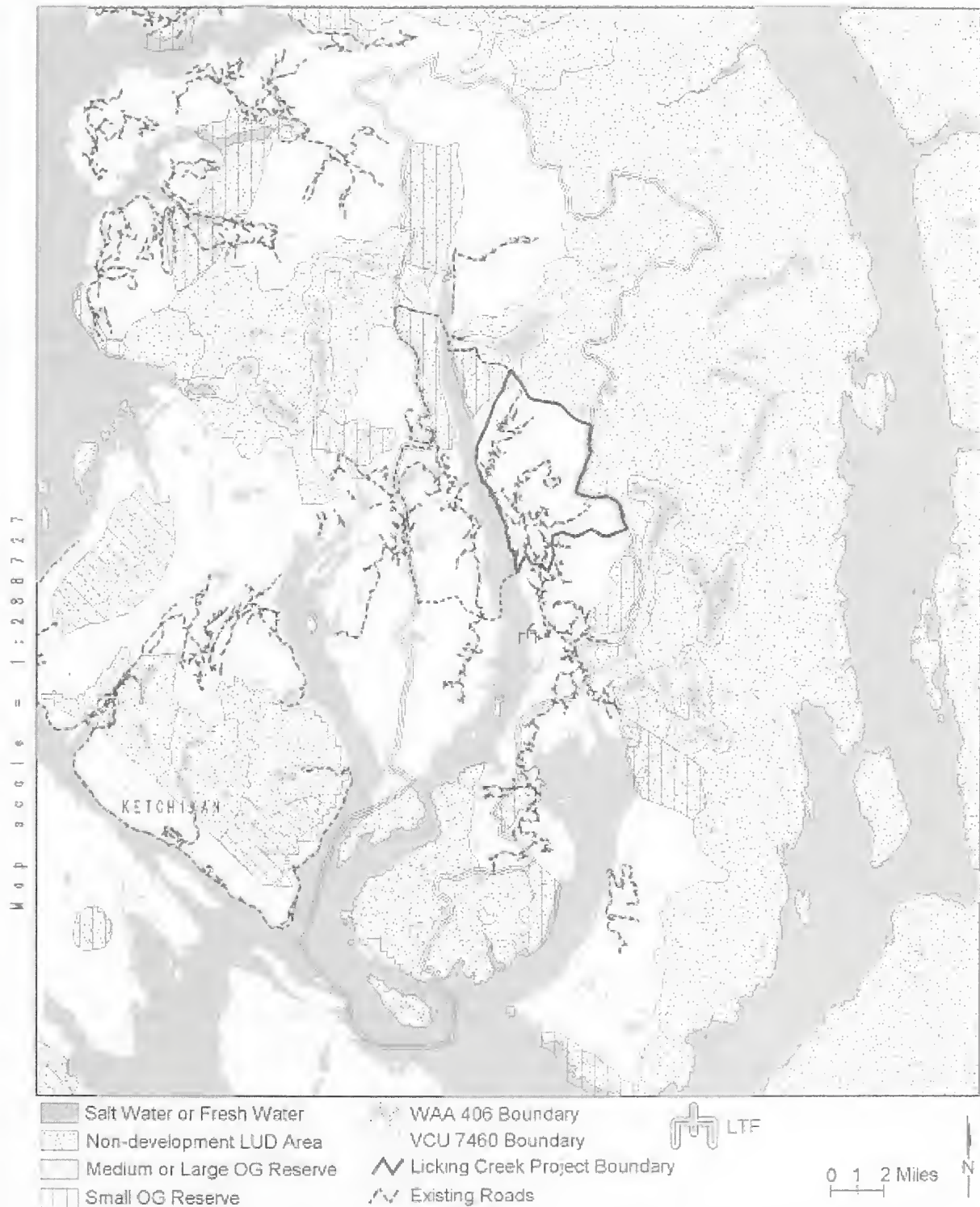
#### **Old-growth Reserve in VCU 7460**

The Licking Creek project area is located in VCU 7460. Two small OGRs occur within VCU 7460 (Figure 3-6). One small OGR is outside the project area on the west side of Carroll Inlet. Less than 1 percent of the Licking Creek project area is within the other small OGR. This small OGR encompasses approximately 5,358 acres (17 percent of the VCU), including approximately 3,019 acres of productive old growth.

The small OGR was reviewed by an interagency team of biologists as part of the Sea Level Timber Sale EIS, for which a Record of Decision (ROD) was signed in 1999. Representatives of the USFWS and ADF&G agreed that the OGR in this VCU met the criteria described in Appendix K of the Forest Plan, and that no additional review is required for the Licking Creek project (T. Woods, USFWS and J. Gustafson, ADF&G, concurrence letters 2001). No modifications are planned to the OGRs under the Licking Creek project. Therefore, the project has no effect on small Old-growth Reserves and this topic will not be analyzed further.



Figure 3-6  
Old Growth Reserves in the Licking Creek Vicinity



Note: Portions of OGRs that occur in non-development LUDs such as the Naha area (LUD II) are not displayed, as these areas are already protected through the LUD designation.  
Source: J. Llanos, GIS, 2002

### 3 Environment and Effects

#### Productive Old Growth

Productive old-growth (POG) forest, defined as old-growth-condition forest having a timber volume greater than 8 thousand board feet (MBF) per acre, is valuable for commercial purposes and wildlife. It was estimated to be approximately 9,500 acres within the project area (on National Forest System lands) prior to timber harvest, which began about 1954 (Table 3-23). It was estimated at approximately 20,000 acres within VCU 7460 and 62,000 acres within Wildlife Analysis Area (WAA) 406. As of year 2002, POG remaining after timber harvest (the remaining POG includes other timber sales which have been sold, but as yet are uncut) varies from 69 percent of historical levels within the project area to 83 percent within the Wildlife Analysis Area (WAA) 406. Of the POG currently remaining in the project area, 63 percent is tentatively suitable and available for timber harvest (see the Silviculture and Timber Management section); some of these acres are in units scheduled to be harvested. The rest of the POG is in beach or riparian buffers, OGRs, other LUDs in which harvest is not allowed, or in areas with steep slopes, unstable soils, isolated stands, visual concerns, etc. (Forest Plan VCU Matrix Appendix 10 5/97). For purposes of analysis, private lands were considered to have zero acres of POG and were not used in these calculations.

Low-elevation POG forest (below 1,500 feet in elevation) is the best habitat for many old-growth associated species, including Sitka black-tailed deer, northern goshawks, and American marten. Relocations of radio-marked Alexander Archipelago wolves indicate that they, too, rely heavily on low-elevation habitats. More timber harvest has occurred in low-elevation habitats than higher elevations. In the Licking Creek project area, 37 percent of the POG below 1,500 feet had been harvested by 2002 (Table 3-23).

Table 3-23  
Percent of Productive Old Growth Existing in 2002

Area	National Forest Acres <sup>1</sup>	Productive Old Growth			Productive Old Growth below 1,500 feet		
		Pre-1954 acres <sup>3</sup>	Year 2002 (current acres) <sup>2</sup>	(% of 1954 acres)	Pre-1954 acres <sup>4</sup>	Year 2002 (current acres) <sup>2</sup>	(% of 1954 acres)
Project Area	14,321	9,500	6,576	69%	7,600	4,761	63%
VCU 7460	30,525	20,000	15,201	76%	17,700	13,068	74%
WAA 406	122,804	62,000	51,282	83%	53,900	43,431	81%

<sup>1</sup> National Forest System land acres. Does not include lakes, saltwater, or other ownerships.

<sup>2</sup> NEPA-cleared and sold Sea Level units that have not yet been harvested were treated as already cut.

<sup>3</sup> Approximate POG acres

<sup>4</sup> Approximate low POG acres

Source: GIS, 2001, 2002

High-volume POG forest below 1,500 feet in elevation is important winter habitat for most of the management indicator species listed in the Forest Plan and in the Licking Creek project area. It receives the greatest HSI values within the deer and marten models. See the Wildlife section of this chapter for discussion of the effects of timber harvest on these species and related reductions in habitat. (For additional information, see the Wildlife Resource Report in the project planning record.)

Coarse canopy forests have the structure typically associated with old growth forests: canopy gaps, fewer and larger trees, and a multiple-layer canopy. They provide a high level of snow interception and are therefore especially important during the winter. Caouette, Kramer, and Nowacki (2000) analyzed the differences between various methods of describing forest stands at a large scale. The current method of describing high, medium, and low volume strata, although appearing to be satisfactory to describe volume, was less accurate for identifying structure characteristics. Their analysis showed that volume class designations may more accurately portray forest stand structure, and that volume classes 6 and 7 could be used to

estimate coarse canopy forest. (Volume classes are discussed further in the Silviculture and Timber Management section.) Almost 6 percent of the POG in the project area is in volume class 6 (Silviculture Table 3-35), and approximately 37 percent of this acreage is contained in a non-harvest LUD or protected from harvest by Forest Plan Standards and Guidelines.

## Rare Plants

Rare plant surveys were conducted in conjunction with the surveys for threatened and endangered plants. Three rare plant species and two sensitive plant species were found in the project area. The populations of the sensitive species *Carex lenticularis* var. *dolia* and *Glyceria leptostachya* and the rare plant *Mimulus lewisii* would not be impacted by the project, because none of the plants were located within unit boundaries or along proposed road locations. The rare plant *Listera convallarioides* was located in four units, and the rare plant *Galium kamtschaticum* was found in two of these units in association with *Listera convallarioides*. The rare plant locations were flagged by the botanist to be protected during yarding. More detailed information is in the Rare Plant Resource Report located in the project planning record.

## Habitat Corridors and Connectivity

Habitat corridors between blocks of old-growth forest can be important to minimize the isolation and decline of wildlife populations within the blocks (Harris 1984, 1985; Hunter 1990). The Forest Plan provides for corridors between large and medium Old-growth Reserves and other non-development LUDs at the landscape scale. Small OGRs, beach fringe, estuary, riparian buffers, and areas deemed inoperable for timber harvest can all act as habitat corridors between old-growth blocks and serve as dispersal corridors between summer and winter habitat. Where beach, estuary, and riparian buffers and other unsuitable lands do not provide sufficient connectivity, additional stands should be included to create functioning corridors.

Prior to timber harvest, major creek valleys such as Calamity Creek and Marble Creek likely served as migration/dispersal corridors between Carroll Inlet and what is now Misty Fiords National Monument. These valleys originally contained extensive amounts of connected old growth. Timber harvest between 1971 and 1994 disrupted portions of this old-growth connectivity. Approximately 400 acres were harvested within the riparian management zone prior to the 1997 Forest Plan. See the Issue 3: Watersheds and Fish Habitat section in this chapter for a breakdown by streamclass. Additionally, timber harvest totaling approximately 284 acres in five harvest units occurred in the project area beach buffer between 1954 and 1962. Five of these clearcut units in the beach buffer have resulted in second-growth stands in the "stem exclusion" stage that effectively sever sections of the beach buffer. No further harvest is permitted in beach/estuary or riparian buffers (Forest Plan). A connectivity analysis was done for the Sea Level Timber Sale EIS, which completely encompasses the Licking Creek project area. Additional corridors were identified during that analysis, but these are outside of the Licking Creek project area and would not be affected. In consideration of these results and the proximity of the Licking Creek project area to Misty Fiords National Monument to the east and a semi-remote recreation LUD to the north, further analysis was not conducted for this project.

## Environmental Consequences

### Direct and Indirect Effects of Timber Harvest

The action alternatives for the Licking Creek project propose harvesting between 205 and 694 acres of productive old-growth (POG) forest (Table 3-24), using a combination of even-aged and uneven-aged silvicultural prescriptions (Table 3-36). For old-growth analysis purposes, if a unit was proposed for harvest, we deleted it from the POG acreage, regardless of the silvicultural prescription used. Within the Timber Management LUD, units that do not occur in high-value marten habitat would be harvested by traditional clearcutting, which is the most economically efficient harvest technique. To meet Forest Plan Standards and Guidelines within high-value marten habitat, 10 to 20 percent of the timber would be retained. Trees may be retained in clumps or "islands" within a given unit, or may be more evenly distributed



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throughout the unit. They may also contribute to areas deferred from harvest activities for other resource concerns, including stream buffers, steep slopes, unsuitable soils, etc. In these units, actual openings in the forest canopy created by timber harvest would be smaller than the overall sizes of units, and some mature trees would remain after harvest. Consequently, the actual reduction in old-growth acres would be somewhat less than displayed.

Of the action alternatives, Alternative 6 would harvest the fewest acres (Table 3-24) and maintain the greatest amount of POG. Alternative 2 ranks closely behind Alternative 6 in this respect. Alternative 4 would harvest the most total acres and maintain the least amount of POG. Alternative 5 is very similar to Alternative 4. The effects of Alternative 3 would be intermediate between Alternatives 2 and 4. The alternatives would have similar effects on low-elevation POG.

**Table 3-24**  
Effects of Proposed Harvest On Current Productive Old Growth

Alternative	POG Acres Harvested <sup>1</sup>	Percent of Current POG Remaining after Harvest		Low-elevation POG Acres Harvested	Percent of Current Low-elevation POG Remaining after Harvest	
		Project Area	VCU 7460		Project Area	VCU 7460
Alt. 1	0	100%	100%	0	100%	100%
Alt. 2	223	97%	99%	195	96%	99%
Alt. 3	525	92%	97%	473	90%	96%
Alt. 4	694	89%	95%	660	86%	95%
Alt. 5	693	89%	95%	645	86%	95%
Alt. 6	205	97%	99%	205	96%	98%

<sup>1</sup> POG Acres do not include low-productivity (less than volume class 4) areas within units.

Source: Current POG acres, J. Llanos 2001, 2002, 2003.

In general, there is an inverse relationship between timber harvest and habitat capability. As more old growth is harvested, the greater the reduction in carrying capacity for old-growth dependent species. Project effects are relatively minor. Current POG would be reduced by 3 to 11 percent within the project area and by 1 to 5 percent within VCU 7460. In all alternatives, the harvest of POG is 1 percent or less at the WAA level. The majority of POG and high-volume POG within the project area and VCU 7460 would remain after harvest of this project is complete. Therefore, although all action alternatives propose to harvest old-growth forest habitat, none is anticipated to directly impact the old-growth ecosystem to a degree at which biological diversity or population viability would be compromised.

Alternative 6 would harvest only 1 acre of coarse canopy forest, as measured by volume classes 6 and 7. Of the remaining action alternatives, Alternative 2 would harvest the least amount (9 percent) of coarse canopy old growth, followed by Alternative 5 (23 percent), Alternative 4 (26 percent), and Alternative 3 (28 percent) (Table 3-25).



Table 3-25  
Harvest of Coarse Canopy Old Growth by Alternative

POG	Acres of Coarse Canopy <sup>1</sup>		Acres of Coarse Canopy in Proposed Harvest						
	Total	Harvest not	Timber harvest	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
		permitted <sup>2</sup>	permitted						
6,576	367	135.5	231.5	0	34	104	94	85	1

<sup>1</sup> Volume classes 6 and 7

<sup>2</sup> Includes lands protected by non-harvest LUDs as well as those protected under Standards and Guidelines

Source: J. Llanos, 2002, 2003

## Alternative 1

Alternative 1, No Action, has the least impact among the Licking Creek alternatives. It would maintain the current old-growth acres and patch size.

## Alternative 2

Alternative 2 ranks close behind Alternative 6 for minimal effect on old-growth habitat. It harvests less than half the acres of POG and maintains more coarse canopy old-growth forest than Alternatives 3, 4 or 5. It harvests slightly fewer acres of low-elevation POG than Alternative 6.

## Alternative 3

Alternative 3 is intermediate of the action alternatives in its effects on old-growth habitat. It would harvest more acres than Alternatives 2 and 6, but less than Alternatives 4 and 5. However, it proposes to harvest the most coarse canopy old-growth acres.

## Alternative 4

Alternative 4 would have the greatest effect on old-growth habitat of the action alternatives. It would harvest the greatest amount of POG and low-elevation POG, and would harvest the second-largest amount of coarse canopy old-growth acres.

## Alternative 5

Alternative 5 is very similar to Alternative 4. It would harvest only one less acre of POG than Alternative 4. However, it proposes to harvest less low-elevation POG and fewer acres of coarse canopy old growth, which are key habitats.

## Alternative 6

Alternative 6 would have the least effect of the action alternatives on old-growth habitat. It harvests fewer acres of POG and maintains more coarse canopy old-growth forest than the other alternatives. However, it harvests slightly more low-elevation POG than Alternative 2.

## Cumulative Effects of Timber Harvest

We calculated the cumulative reductions in project area and VCU POG that would result from the Licking Creek alternatives and other planned timber sales in the VCU (Table 3-26). These reductions were based on the estimated pre-harvest (1954) acres of POG. If a unit was proposed for harvest, we deleted it from the POG acreage, regardless of the silvicultural prescription used. This results in a conservative, or "worst case", estimate of the impact of timber harvest on old-growth forest habitat. The private land parcel in the Licking Creek project area was harvested in 1974, and therefore was considered to have zero acres of existing POG. No timber sales are proposed for this parcel in the foreseeable future.

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Table 3-26  
Percent of Historical Productive Old Growth Remaining After Additional Timber Sales are Cut

Cumulative Action	Percent of 1954 POG remaining after harvest		
	Project Area	VCU 7460	WAA 406
Other Sales + Lick Cr Alt. 1	67%	73%	81%
Other Sales + Lick Cr Alt. 2	64%	72%	81%
Other Sales + Lick Cr Alt. 3	61%	71%	80%
Other Sales + Lick Cr Alt. 4	59%	70%	80%
Other Sales + Lick Cr Alt. 5	59%	70%	80%
Other Sales + Lick Cr Alt. 6	64%	72%	81%

Source: J. Llanos 2002, 2003; Sea Level harvest acres implemented Unit Cards; Mop Pt./91 Knot Timber Sale Report

Alternative 6 would have the least effect on POG and Alternative 4 the greatest. Alternative 4 would maintain over half of the historical POG within the project area and over two-thirds of the historical POG within VCU 7460 and WAA 406. Low elevation POG percentages are slightly less than the overall POG percentages shown (Table 3-26), but the project would still maintain about half of the low elevation POG within the project area and about two-thirds of the low elevation POG at the VCU and WAA levels.

The Forest Plan, as previously discussed, includes a Forest-wide habitat conservation strategy designed to provide reasonable assurance of protecting adequate habitat to maintain viable fish and wildlife populations. In addition, all applicable Forest Plan Standards and Guidelines that are also integral parts of the strategy—such as riparian management areas, beach and estuary fringe protection, landscape connectivity, and marten guidelines—are fully incorporated into the Licking Creek project action alternatives. Therefore, it is anticipated that forest management activities on the Licking Creek project area would not pose a significant threat to the viability of populations representing the biodiversity of the old-growth ecosystem on National Forest System lands. (See the Wildlife and Threatened, Endangered and Sensitive Species sections for further information on how reductions in old growth affect wildlife populations.)

## Geology, Minerals, and Karst

This section provides an overview of the geology, minerals and karst resources of the Licking Creek project area. Information from the Forest Service's GIS database, and field surveys of the project area were used. A Forest-wide treatment of geology, minerals and karst resources may be found in the Forest Plan Final EIS, Chapter 3, and the Forest Plan, Chapter 4 and Appendix I. The unit and road cards (Appendix B of the Draft EIS) contain additional site-specific mitigation for implementation.

### Affected Environment

#### Geologic Setting

The Licking Creek project area is predominately underlain by metasedimentary and metavolcanic rocks from the Mesozoic and Paleozoic geologic periods (Figure 3-7). These rocks outcrop as dark-gray, silvery-gray, or greenish-gray phyllite and semischist, interbedded with white, dolomitic marble and grayish-blue and white banded marble. These rocks were intruded by granite in the Cretaceous period. The rock units have been intensely folded, are nearly vertically dipping and offset by major northeast-southwest trending faults, and have been subsequently glaciated, weathered, and eroded. The glacial ice sheet flowed over the more-resistant granite and deeply scoured the less-resistant sedimentary and volcanic rocks, creating deep, narrow valleys occupied by long, linear lakes. More recent volcanic activity spewed rocks and ash (basalts, andesites and pyroclastic deposits) onto this heavily glaciated landscape. Karst landforms and drainage systems have developed within the marble and dolomitic marble outcrops to varying extent. Some erosional or gas pocket caves have been identified within the recent ash deposits.

#### Minerals and Mining Claims

The U.S. Bureau of Mines, during field investigations from 1990 to 1994, did not find any mines, prospects, or mineral occurrences within the Licking Creek project area (Maas et al. 1995). The Sealevel Mine and associated prospects lie just south of the project area. These claims and prospects were mined from 1897 to 1940, and yielded gold from sulfides in quartz veins within the metasedimentary and metavolcanic rocks (Maas et al., 1995).

Bureau of Land Management mining claim activity reports indicate that there are no mining claims currently within the project area. Their records show there are five patented mining claims within the project area, in lower Marble Creek. These claims were first staked in 1902, on white, dolomitic marble, and were patented in 1924.

### Karst Resources

Karst is a comprehensive term that applies to the unique topography, surface and subsurface drainage systems, and landforms that develop by the action of water on carbonate (soluble rock; limestone and marble in Southeast Alaska). The dissolution of the rock results in the development of internal drainage, producing sinking streams (streams that sink into the stream bed or karst features), closed depressions, sinkholes, collapsed channels, and caves (White et al. 1995).

The geology and climate of Southeast Alaska are particularly favorable for karst development. Extensive areas of very pure carbonate, approximately 515,000 acres, are found within the boundaries of the Tongass National Forest. Because of fractures in the carbonate, high annual precipitation, and peatlands adjacent to the bedrock, karst has developed, to varying extent, within all carbonate blocks. The Tongass National Forest contains the largest known concentration of dissolution caves in Alaska.

Carbonate rock within the Licking Creek project area includes dolomitic marble. Dolomitic marble does not typically occur in Southern Southeast Alaska, and it is suspected that

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dolomitization has in some way suppressed karst development. The undulating topography characteristic of a karst landscape is present, but visible epikarst fractures and collapse features are not prevalent and small surface streams flow across the forest floor on top of the dolomitic marble.

#### Forest Plan Standards and Guidelines

Karst lands impose special land management challenges. Recognizing this, the Tongass National Forest incorporated Karst Management Standards and Guidelines into the Forest Plan. These Standards and Guidelines categorize karst areas by their vulnerability to being adversely affected by management activities. Vulnerability is a function of the extent of karst development, the openness of the karst system, and the sensitivity of other resources that benefit from the karst groundwater systems. Within the project area, karst vulnerability is characterized as follows:

**Low Vulnerability:** These areas have been modified by glaciation, are highly weathered, or show limited karst development. They may be underlain by dolomitic marble. Within the project area, these areas generally occupy the lower third of the glacial valleys, and have a deep (over 40" deep) covering of glacial till with limited epikarst showing. Surface drainages may be present. Low-vulnerability karst lands have no karst-specific management restrictions.

**Moderate Vulnerability:** These areas have moderate- to well-developed epikarst (karst visible on the surface). They tend to be on the upper two-thirds of the valley slopes. The epikarst valleys are filled or partially filled with residual soil and/or glacial till. On dolomitic marble, small surface streams flow across less-permeable beds, sometimes sinking for a short distance and continuing on the surface thereafter. These lands are unlikely to introduce organic sediment and debris into the underlying karst hydrologic systems. Partial-suspension harvest systems are required to minimize soil disturbance.

**High Vulnerability:** These areas include all collapsed karst features, caves, sinking streams and resurgences, and the small, high-gradient watersheds that flow into these features. Also considered high vulnerability are karst lands in which the epikarst is well- or extremely well-developed, with predominately very shallow organic and mineral soils. They tend to occur at higher elevations. These features can move organics, sediments, and debris down very rapidly into the underlying karst hydrologic systems if disturbed. The entrance area surrounding resurgences should be protected to maintain the quality of the water flowing from them. High-vulnerability karst land is considered unsuitable for timber management and is removed from the suitable land base. Minimum 100-foot windfirm buffers are applied where areas of high vulnerability karst are found within or adjacent to areas of moderate vulnerability karst. No surface disturbing activities are allowed within these buffers (Forest Plan Appendix I-14).

#### Karst in the Project Area

Portions of the project area (1,892 acres) are underlain by marble and dolomitic marble, and karst drainages have developed (though are sometimes limited) in all of the marble (carbonate) blocks (Figure 3-8). Of these acres, 288.9 acres have been mapped as high vulnerability karst. Past timber harvest has occurred on 856 acres (45 percent) of karst lands in the project area, of which 661.7 acres was on dolomitic marble.

Karst development seems to be limited in the "main" karst band that underlies proposed Units 9, 10 (easternmost portion), 14, 40, 64, 65, 67, and 71 (Figure 3-8). Chemical analysis of three samples from this band show it to be dolomitized (Maas et al., 1995). However, some karst features (sinkholes, small vertical pits, and small resurgences) were found in Units 40, 64 and 71. In Unit 71, these features seemed to be located in lenses of more pure carbonate than found throughout the remainder of the unit.

Extensive karst and cave systems have developed in the easternmost marble band in the project area (Figure 3-8). Drainages disappear along the margins of the faulted marble blocks, and sinkholes and other collapsed features are found across the surface of the karst plateaus. The high-vulnerability karst lands associated with this band were deleted from the proposed unit



pool. The portion of this band underlying harvest Unit 34 is of moderate vulnerability. Portions of Units 33 and 35 were excluded from harvest to protect high vulnerability karst.

## Environmental Consequences

### Direct and Indirect Effects

#### Effects on Minerals

The proposed action would have no direct impacts on mineral resources. Geologic mapping would be enhanced by increased exposure of rock due to road construction and quarry development. With better exposures of the rock, new mineral discoveries become possible. The chemically pure carbonates of Alaska have long been considered for their commodity values. The more pure the carbonate bedrock, the more intense karst development may be. The impacts of any proposed mineral development within the karst landscape would be analyzed once a plan of operation was received. However, on karst lands found to be of unquestionably high vulnerability, mineral development would not be appropriate.

#### Effects on Karst

Karst lands have separate issues and concerns from other landforms because karst is a three-dimensional landform with closely integrated surface and subsurface processes. Groundwater flows relatively slowly through porous rock and soil, or through fractures, in non-karst terrain. In karst terrain, groundwater may flow relatively quickly through complex underground systems of fissures and caves. Concerns primarily involve potential changes of groundwater flow in these underground systems. Any management activity that causes sediment or organic debris to build up in the subsurface drainage system decreases its capacity and makes it more likely that surface streams will form. Similarly, any management activity that increases the volume of water flowing underground can also make surface flow more likely.

Primary impacts from past timber harvest have been from sediment transport into karst systems, due to the size of harvest blocks and the rate at which the landscape was harvested. The initial flush of sediment and debris, immediately after harvest with the first storm cycles, is believed to have delivered the majority of the material into the karst systems. Sediment has been transported underground to distant springs, and due to blockage of underground passages, surface stream flow and erosion has increased in some areas. Current harvest practices lessen these effects. These include partial cutting, reduced harvest unit size, logging systems that achieve at least partial suspension, and extending the rotation period.

The proposed timber harvest is not expected to have significant long-term effects on water flow in the Licking Creek project area. The removal of forest vegetation reduces both the evaporation and transpiration of water from a site, temporarily increasing the water available for surface or subsurface flow until the vegetation grows back. This can increase groundwater recharge, and surface water flow during major rainstorms could occur more frequently. However, due to rapid re-vegetation, the limited size and broad distribution of proposed harvest units, and the 100-year rotation period, these effects would be temporary, and permanent hydrologic changes are not expected.

#### Project Design Criteria

A karst resource assessment was used to plan timber harvest on the karst lands in the project area. Forest Plan Standards and Guidelines, best management practices (BMPs), and site-specific design criteria have been used to minimize adverse effects to karst. Following Forest Plan Standards and Guidelines, high-vulnerability karst lands were excluded from harvest. Streams that flowed subsurface within carbonate bands were fully protected and the karst systems they flowed into were also removed from consideration for harvest.

High-vulnerability karst blocks and features were excluded from harvest and buffered to maintain their integrity and biological function. Traditional buffers of 100 feet beyond the slope break surrounding a feature were modified to include an additional buffer to provide a "reasonable assurance of windfirmness." A distance of two tree heights was applied as a

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minimum buffer. Portions of Unit 10 (12.4 acres), Unit 33 (4.2 acres), and Unit 64 (6.3 acres) were removed from the suitable timber base, and the boundaries of Units 22 and 35 were modified to exclude high-vulnerability karst. In addition, the steep slopes between the high-vulnerability karst band and Unit 35 were removed from consideration for harvest because of slope stability and sedimentation concerns, and to protect the karst systems at the slope's base. The spring and intermittent stream that flows through Unit 65 would also be protected.

Roads were designed to avoid impacts to high-vulnerability karst. The road through Unit 71 was re-aligned (from that shown in the Draft EIS) to protect karst features.

Given the glacial history and the depth of sediment deposition associated with much of the project area, surveys were conducted in those areas having the highest probability for extensive karst development. If additional features were found during harvest unit layout, the appropriate Standards and Guidelines would be applied.

It was determined that dye-trace tests were not necessary within the harvest units proposed on dolomitic marble (low and moderate vulnerability karst), since observed streams were either on the surface or only went subsurface for short distances (a few feet) before resurfacing.

No special mitigation is needed for timber harvest on low-vulnerability karst. It was determined that the moderate-vulnerability areas would be suitable for timber harvest with use of partial suspension harvest systems to minimize soil disturbance. Should the partial harvest areas in the selected units remain windfirm, there should be few threats to the karst features within the project area. These mitigations are specified on the unit and road cards (Appendix B of the Draft EIS); the need for some requirements would be determined during project layout.

## Direct and Indirect Effects of the Alternatives

### Alternative 1

Timber harvesting and related activities are not proposed within the project area as part of Alternative 1. Natural erosion and transport processes, including mass wasting, surface erosion, and stream erosion, would continue. All of these natural processes contribute sediment to karst systems.

### Alternative 2

Among the action alternatives, Alternative 2 proposes 15.4 acres of harvest on carbonate rock and low- and moderate-vulnerability karst (of which 9.0 acres are on dolomitic marble). This alternative also proposes 0.7 mile of road reconstruction and 0.1 mile of new road construction on carbonate rock (Table 3-27). This is a 1 percent increase in the total past and planned harvest, and a 1 percent increase in total road miles (open and closed), on carbonate rock within the project area.

### Alternative 3

Alternative 3 proposes 139.7 acres of harvest on carbonate rock and low- and moderate-vulnerability karst (of which 130.9 acres are on dolomitic marble). This alternative also proposes 0.7 mile of road reconstruction and 0.2 miles of new road construction on carbonate rock (Table 3-27). This is a 7.4 percent increase over total past and planned harvest, and a 2 percent increase in total road miles (open and closed), on carbonate rock within the project area.

### Alternative 4

Alternative 4 proposes the greatest acres of harvest on carbonate rock and low- and moderate-vulnerability karst (234.1 acres, of which 215.4 acres are on dolomitic marble). This alternative also proposes 0.7 mile of road reconstruction and the most miles of new road construction (1.7 miles) on carbonate rock (Table 3-27). This is a 12.4 percent increase over total past and planned harvest, and a 16 percent increase in total road miles (open and closed), on carbonate rock within the project area.

## **Alternative 5**

Alternative 5 proposes 194.5 acres of harvest on carbonate rock and low- and moderate-vulnerability karst (of which 184.9 acres are on dolomitic marble). This alternative also proposes 0.7 mile of road reconstruction and no new road construction on carbonate rock (Table 3-27). This is a 10.3 percent increase over total past and planned harvest on carbonate rock within the project area.

## **Alternative 6**

Alternative 6 proposes 34.3 acres of harvest on carbonate rock and low- and moderate-vulnerability karst (of which 18.2 acres are on dolomitic marble). This alternative proposes no road reconstruction and no new road construction (Table 3-27). This is a 1.8 percent increase over total past and planned harvest on carbonate rock within the project area.

## **Cumulative Effects**

### **Alternative 1**

Timber harvesting and related activities are not proposed within the project area as part of Alternative 1. The Madder Timber Sale, which is scheduled to be sold, will harvest 111 acres and build 1.7 miles of new road on carbonate rock. No harvest or roadbuilding on karst is planned as part of the Mop Point/91 Knot Timber Sales. The cumulative total of past and planned harvest on carbonate acres on National Forest System lands is 51 percent, and 8.5 miles of road on carbonate (Table 3-27).

The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. All of this past timber harvest was on a band of medium vulnerability karst.

### **Alternatives 2, 3, 4, 5, and 6**

The cumulative total of past, planned and proposed harvest on carbonate on National Forest System lands varies from a low of 51.9 percent (Alternative 2) to 63.5 percent (Alternative 4), and the cumulative total of existing, planned and proposed roads on karst varies from 8.5 miles (Alternative 6) to 10.9 miles (Alternative 4) (Table 3-27). Alternative 6 would have the least effect on karst acres, and Alternative 4 the greatest. Under Alternative 6, we would build no new roads, but would harvest 18.9 acres more karst than under Alternative 2. Given the potential impacts from roading, it is believed that Alternative 6 would have the least impact on the karst resources.

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Table 3-27  
Effects of the Alternatives on Low- and Medium-vulnerability Karst Lands in the Licking Creek Project Area

	Alt. 1 No Action	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Past harvest on karst (NFS acres)	856.0	856.0	856.0	856.0	856.0	856.0
Proposed harvest on karst (acres)	0	15.4	139.7	234.1	194.5	34.3
Proposed harvest on karst due to Madder Timber Sale (acres)	111.0	111.0	111.0	111.0	111.0	111.0
Cumulative percent of karst harvested <sup>1</sup>	51.1%	51.9%	58.5%	63.5%	61.4%	52.9%
Existing road on karst (miles)	6.8	6.8	6.8	6.8	6.8	6.8
Road on karst planned to be built for Madder Timber Sale (miles)	1.7	1.7	1.7	1.7	1.7	1.7
Road on karst to be reconstructed (miles)	0	0.7	0.7	0.7	0.7	0
Proposed new road on karst (miles)	0	0.1	0.2	1.7	0	0
Cumulative miles of road on karst <sup>1</sup>	8.5	9.3	9.4	10.9	9.2	8.5

<sup>1</sup> From proposed, scheduled and past harvest activities (1,892 acres total karst ) on National Forest System acres.  
Source: J. Llanos, GIS, 2002, 2003



Figure 3-7  
Geology Rock Types in the Licking Creek Project Area



Pm = Paleozoic marble; Pdolm = Paleozoic dolo mite; MzPzcp = Mesozoic/Paleozoic calcareous phyllite  
Source: J. Llanos, 2002

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Figure 3-8  
Karst Vulnerability in the Licking Creek Project Area



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Source: J. Llanos, 2003

## Heritage Resources

Heritage resources include all evidence of human-related activity, dating from the earliest beginnings to the fairly recent past. In accordance with the National Historic Preservation Act of 1966 (as amended), and the implementing regulations (36 CFR 800), the Tongass National Forest is undertaking a program to identify, evaluate, preserve, and protect heritage resources as a nonrenewable National heritage. The purpose of these investigations is to identify any possible impacts that proposed activities would have on recorded heritage resources in the area that may be eligible for inclusion in the National Register of Historic Places.

### Background

#### Cultural History of the Project Area

Southern Southeast Alaska has a unique cultural history, which includes the potential for occupation dating from the Paleomarine-Early Prehistoric Maritime period (10,000 B.C. to 4500 B.C.), through the Northwest Coast Developmental Phase - Late Prehistoric Maritime (4500 B.C. to A.D. 1700), to the protohistoric-historic Tlingit (A.D. 1700 to A.D. 1746). Prehistorically, extensive use of the rugged terrain in the vicinity of the project area is indicated. In the vicinity of Carroll Inlet and Thorne Arm, we have identified a number of fish traps, both stone and wood-stake fish weirs, middens, and rock art sites, along with historic sites, which include mines, cabin sites, a fox farm and culturally modified trees. However, only one site, KET-423, has been located within the boundary of the Licking Creek project area.

The project area is included in the traditional homeland of the Tlingit. Immediately prior to European settlement, the project area was occupied by two Southern Tlingit groups, the Saanyakwaan (also referred to as Saxman or Cape Fox Tribe) and the Taantakwaan (also referred to as Tongass or Ketchikan Tribe). The northern half of Revillagigedo Island was also apparently occupied at one time by the Xetlkwaan (Foam House People or the Stikine Tribe), who now reside in the Wrangell area.

The original territory of the Cape Fox Tribe (from north to south) included the southwest portion of the Cleveland Peninsula, the southern half of Revillagigedo Island, and the west coast of the mainland south to the Portland Canal area (Goldschmidt and Haas 1946). Originally centered on one-third of southern Prince of Wales Island, the Tongass Tribe migrated east about 1720. This eventually led to major conflicts between the Tongass, Cape Fox, and Stikine Tribes in the early part of the nineteenth century. As a result, the Stikine abandoned the area and moved to Wrangell, their territory absorbed by the Cape Fox; the Tongass displaced the Cape Fox from their southern territory and the southwest coast of Revillagigedo Island. By the end of the nineteenth century, however, due to increased Euro-American influence in the area, both groups consolidated and established separate settlements on the southwest coast of Revillagigedo Island: the Tongass at the present day city of , and the Cape Fox at Saxman (Arndt, Sackett and Ketz 1987).

The written cultural history in Alaska began with the second Kamchatka Expedition of Vitus Bering in 1741 and developed through various stages of contact with European people and goods. Historic explorations in the project vicinity occurred in 1792, with the Jacinto Caamano expedition, and in 1793, when George Vancouver's long boats explored Behm Canal from Port Protection where the British ships Discovery and Chatham were anchored (Mobley 1989).

## Affected Environment

#### Heritage Resources Inventory

The Licking Creek Inventory strategy involved a pre-field investigation literature search; government-to-government consultation with the Ketchikan Indian Corporation (July 20,



## 3 Environment and Effects

2001), the Saxman IRA (August 13, 2001), and the Metlakatla Indian Community (November 1, 2001); and consultation with two tribal Elders, Martin Perez from Saxman and Flora Feller from the Tongass Tribe. These consultations within the Native community are continuing. Previous work within the Licking Creek project area and vicinity has provided a significant amount of information about heritage resource activities and locations. This work included surveys conducted in the project area and vicinity from 1978-1995. Additional surveys were conducted for this project in 2001. Field investigations were focused on the High Sensitivity Zone, which are areas from Sea Level to 100 feet in elevation, karst areas, areas associated with oral histories, previously mined areas, passes and portages, and the shores of certain streams and lakes. Surveys also sampled other areas with a low likelihood to contain heritage resources.

Only one heritage site, KET-423, a small prehistoric midden site, was identified in the project area. Specific location information is protected to prevent vandalism or unauthorized use of this site. No proposed harvest units are located within the high-sensitivity zone under any of the action alternatives.

These results have been documented and forwarded to the State Historic Preservation Officer (SHPO) for review as required by the National Historic Preservation Act and 36 Code of Federal Regulation 800. The SHPO review has been completed for the proposed activity in the Licking Creek project area, with a determination that no sites eligible for the National Register of Historic Places will be affected.

### Environmental Consequences

#### Direct and Indirect Effects

Heritage resources may be impacted from natural forces (such as erosion), public access, or project-related activities. The construction and reconstruction of roads can lead to an increase in public use of heritage resources. Such increased use can destroy cultural resource sites through inadvertent damage caused by compaction or other ground-disturbing activities, or direct damage from vandalism (relic collecting, defacement, and theft). Protection of significant cultural resource sites includes the establishment of public education programs, maintaining confidentiality about specific site locations, monitoring, and directing the public away from the most vulnerable sites.

In previous consultation regarding the Sea Level Timber Sale EIS, and on January 14, 2002 for the proposed Licking Creek EIS, the SHPO determined that cultural resource site KET-423 was "Eligible" for the National Register of Historic Places, and concurred that there would be no effect to significant heritage resources. The proposed Licking Creek timber harvest activities are designed to ensure that no timber harvest, road construction or any other proposed activity is planned within the proximity of this significant site under any of the proposed alternatives and these proposed activities would not affect significant heritage resources. Under all action alternatives, cultural resource site KET-423 would be monitored by archaeologists throughout the life of the timber sale to ensure that the site is protected.

#### Cumulative Effects

Cumulative effects on heritage resources occur through natural erosion and weathering as well as from continued development near lands containing heritage sites. Development activities of all kinds pose particular threats to heritage resources, as such activities tend to be located in the same areas that heritage resources are found, such as sheltered coastal settings.

It is impossible to determine the exact nature of resources that may have been previously disturbed in the project area. Intensive cultural resource investigations and mitigation measures have been implemented only since the 1980s. Current research and survey designs are based upon the results of previous work and modern methodology and technology. These methods, combined with various mitigation measures, are designed to preserve significant sites and provide data that will guide future research and resource management.



## Mitigation

Protection of significant heritage resource sites begins early in the planning process when, in accordance with Section 106 of the National Historic Preservation Act (NHPA), a heritage resource survey is conducted to locate any significant archaeological, historical or traditional use sites, evaluate their significance, and determine the potential effects of a proposed project on the resources. This is done in consultation with the SHPO prior to project implementation. Culturally sensitive site-specific information, acquired either through literature search or through consultations with tribal governments and knowledgeable individuals, is kept confidential and protected by statute under the Archeological Resources Protection Act (ARPA) and/or by formal agreements.

Should previously undiscovered archaeological or historical sites be discovered, after the Section 106 process has been completed and project activities are implemented, project activities would be discontinued at the location of the discovery until a professional archaeologist completes a site evaluation. Mitigation measures would be agreed upon and implemented before activities may proceed.

There is also the potential to discover human remains and associated funerary objects, which might include mortuary poles, jewelry, beads, mortuary boxes, and associated clan crest items. If human remains, objects of cultural patrimony or sacred objects, as defined by the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered, the process to be followed in the handling of these remains and cultural items is outlined specifically in 43 CFR 10 Subsection 10.4.

If human remains were discovered during ground-disturbing activities, no further excavation or disturbance would occur in the immediate area. Human remains and any associated funerary objects would not be excavated or removed without consultation with the Tribal Government representatives. The immediate securing and protection of the discovered remains would be accomplished as appropriate for each circumstance. To the extent possible, notification of Tribal Government representatives, the coroner, and the State Troopers would occur within 24 hours of the discovery. To insure appropriate respect, protection, treatment and care, a professional archaeologist would be present during any subsequent inspections or activities.

Appointed Tribal Government representatives would be given the opportunity to be present for examination of the site and would participate in the formulation of a signed mitigation plan, which would detail the further treatment of the remains prior to any further actions. If by consensus, the site and/or human remains are to be covered and remain undisturbed, then the project activity would be moved or redesigned to insure protection. Should removal and/or scientific study be the preferred mitigation, then a report would be compiled that details methods, descriptions, analysis, drawings, photographs, maps and other details or results which would complete the documentation. The final report would be made available to the Tribal Government(s) for review. Upon completion of any analysis, the Forest Service would assist in the reburial of the remains and the conservation and curation of cultural items with a museum which has the ability to properly preserve and curate those items as specified in the signed mitigation plan.

Monitoring of sites determined to be eligible for the National Register of Historic Places would occur throughout all aspects of ground-disturbing activities associated with the proposed project. The frequency of monitoring activities would be determined on a case-by-case basis, which would depend upon the significance of each site, and the sensitivity of the site location to potential damage from recreational use, natural erosion or project activities. Under normal circumstances, National Register eligible sites are monitored in conjunction with other survey work in the vicinity, or annually, unless other protective measures are warranted. These measures may include administrative closure, signing, increased inspection, law enforcement investigation, stabilization, and/or data recovery.

Effectiveness monitoring of the project area may include a sample of high-sensitivity locales within direct impact areas during and/or after the actual ground disturbance, and post-

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disturbance monitoring of a sample of lower-sensitivity locales in areas of actual ground disturbance. The locations and acreage sampled will be determined on a case-by-case basis.

The implementation of these measures throughout project planning and during the harvest activities would provide a high level of protection for significant heritage resources.

## Log Transfer Facilities and Related Sites

### Background

Southeast Alaska's coastline consists of approximately 30,000 miles of tidal shoreline, which is roughly 60 percent of the total Alaskan coast. Within this region, a variety of habitats comprise Southeast Alaska's estuary and tidal environments. Shallow marine waters, mud flats and estuaries provide habitat for shellfish and juvenile salmon. They are part of a complex and dynamic ecosystem that also includes shrimp, flatfish, marine worms, echinoderms, sponges, sea anemones, shellfish, plankton, marine algae, and other organisms.

Log transfer and storage facilities are the points of concentrated activity associated with marine transportation of logs. The preferred sites for log transfer facilities (LTFs), log storage areas, camp settlements, and anchorages are deep bays or coastlines along straits or channels. These areas are preferred because deeper water is generally less productive and stronger currents disperse bark and debris that may enter the water; consequently, there would be fewer impacts to intertidal and subtidal marine life in these areas. Other marine habitats are not addressed here because the timber harvest activities of this project are not likely to affect them.

Each LTF requires a log transfer area, a land-to-barge facility, a small airplane and boat dock, an equipment off-loading ramp, and a log raft storage area (for land-to-water transfers). Logs are trucked to the LTF, watered and assembled into rafts. The log rafts are then towed to processing sites such as the sawmills at Ward Cove or Wrangell. Log sortyard areas are usually required for barge facilities where sorting by raft is not possible. These facilities are generally located within close proximity of the LTF to reduce costs and retain impacts within a localized area.

Log transfer facilities are issued an EPA NPDES (National Pollutant Discharge Elimination System) permit and a State of Alaska tidelands lease.

### Affected Environment

#### Shoal Cove LTF

An existing LTF, with a log sortyard, is located at Shoal Cove near the Licking Creek project area (see Alternative 1 map, Chapter 2). The LTF is an A-frame and a land-to-barge facility that required the construction of a rock bulkhead into the water to operate the facility.

Approximately 250 MMBF of timber has been transferred over it since its construction in 1970. The Shoal Cove LTF was designed to maximize the flushing of suspended bark away from the LTF area to the open sea before it could accumulate on the bottom.

The permits for the Shoal Cove LTF require yearly monitoring for bark deposition, to ensure that the area of 100 percent bark cover is less than 1 acre. A SCUBA dive survey was conducted in 2000 (USDA Forest Service, Underwater Bark Debris Survey Sept. 2000). This survey is available in the planning record. The semi-circular shoreline topography at Shoal Cove appears to focus most of the debris accumulation in the area directly in front of the bulkhead, and creates a defined area in which the 100 percent bark cover area will not reach the 1-acre limit, at least within the 60-foot Mean Low Low Water (MLLW) depth limit.

#### Logging Camps

A land or floating camp would most probably be established for use on this project. All alternatives would require temporary maintenance facilities. These areas will be evaluated for development to comply with all State and Federal permitting requirements.

## Environmental Consequences

### Direct and Indirect Effects

#### Effects of Site Bark Deposition

During the transfer of logs from land to water, bark is sloughed off and may be deposited on the ocean bottom. Bark also is continually sloughed off, while the logs are in rafts, by agitation from wind and waves. Bark may impact marine organisms through smothering, and alteration of habitat and water quality (Forest Plan, Appendix G-7). If bark accumulates on the bottom it can diminish habitat for bottom-dwelling crustaceans and mollusks, as well as hamper underwater vegetation used as food and rearing sites for fish and other organisms. Generally, rafting of logs deposits more bark than barging of logs.

Direct impacts to marine benthic habitats from site bark deposition are estimated to remain at current levels (under 1 acre of 100 percent bark cover), or possibly less. As part of the permitting requirements, survey dives are conducted yearly while active. A copy of the most current dive report is included as Appendix F in this EIS.

#### Effects of Structural Embankments

Although conclusive studies are not available for comparison, barge use at LTFs probably has less overall effect on the marine environment than does rafting, because the logs are not stored in the water. Bark and debris would accumulate only in a small area around the extreme seaward end of the facility. Typically, this is an area of less than 600 square feet.

All action alternatives would use the existing LTF at Shoal Cove. The LTF could also be used for barging at times of high tide, when water depth is adequate. The use of a barge would be optional, under the action alternatives.

### Effects of the Alternatives

#### Alternative 1

No direct effects from timber harvest would result from the No-action Alternative.

#### Alternatives 2, 3, 4, 5 and 6

Action Alternatives 2, 3, 4, 5 and 6 would harvest 10,709, 23,832, 33,556, 32,261 and 11,118 CCF (approximately 5.4 MMBF, 11.9 MMBF, 16.8, 16.1 and 5.6 MMBF of timber), respectively. This volume would be transported via the Shoal Cove LTF. Annual dive monitoring of marine environments, as required under permit, would continue for the duration of use of the LTF.

Contract provisions address the use of facilities that may be used by other purchasers. These provisions allow for the joint use of the log transfer sites, rafting areas, scaling areas, sortyards and camp areas. The contract provisions require purchasers to enter into a cooperative agreement specifying the operation and maintenance responsibilities for facilities that will be used with other purchasers.

### Cumulative Effects

#### Alternative 1

The Madder Timber Sale, which is scheduled to be sold, would harvest 54,600 CCF (25.8 MMBF). (This volume includes approximately 10,600 CCF (4.3 MMBF) that is outside of WAA 406). The Mop Point/91 Knot Timber Sale is scheduled to be sold by 2004, with a harvest of 544 CCF (about 272 MBF). Both sale volumes would be transported via the Shoal Cove LTF. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. Cumulative effects on site bark deposition and structural embankments are expected to remain below permitted levels. Annual dive monitoring of marine environments, as required under permit, would continue for the duration of use of the LTF.

#### Alternatives 2, 3, 4, 5 and 6

Action Alternatives 2, 3, 4, 5 and 6 would harvest 10,709, 23,832, 33,556, 32,261 and 11,118 CCF (approximately 5.4 MMBF, 11.9 MMBF, 16.8, 16.1 and 5.6 MMBF of timber), respectively. The Madder Timber Sale, which is scheduled to be sold, would harvest 54,600 CCF (25.8 MMBF). (This volume includes approximately 10,600 CCF (4.3 MMBF) that is



outside WAA 406). The Mop Point/91 Knot Timber Sale is scheduled to be sold by 2004, with a harvest of 544 CCF (about 272 MBF). All sale volumes would be transported via the Shoal Cove LTF. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. As with the No-action Alternative, cumulative impacts from the action alternatives to marine benthic habitats from site bark deposition and structural embankments are expected to remain below permitted levels. Annual dive monitoring of marine environments, as required under permit, would continue for the duration of use of the LTF.

## Recreation

This section summarizes recreation data collected for the Licking Creek Timber Sale and analyzes the effects of proposed harvest and road construction. The Recreation resource report for the Licking Creek Timber Sale project is tiered to the Forest Plan.

## Affected Environment

### Recreation Demand

The Licking Creek project area was analyzed under the Sea Level Timber Sale EIS and that same information will be used for this analysis. Since the use in this area is dispersed and the Forest Service does not provide or maintain any facilities in this area, use is not recorded on a regular basis.

Southeast Alaska residents place a high value on opportunities for remote, uncrowded outdoor recreation. At the same time, community access is important to those wanting to do more hunting, fishing, and beachcombing. In particular, Ketchikan residents wanted to see an expansion of the usable road system on Revillagigedo Island, primarily for roaded recreation opportunities (Ketchikan Community Survey 1990). Development of new hiking trails and bicycle paths were the most desired opportunities.

### Existing Activities and Use Patterns

Recreation activities in and near the project area include fresh and saltwater sport fishing, hunting, camping, hiking, beachcombing, wildlife and scenic viewing, and boating (kayak, canoe, or motorboat). Flightseeing trips from nearby Ketchikan to Misty Fiords National Monument (MFNM) are common.

The project area is approximately 20 air miles from Ketchikan, the nearest community, and there is no road connection to Ketchikan. Access is by personal or commercial boat and aircraft. Consequently, the project area receives relatively little use for recreation activities, and there are no developed recreation facilities within the project area. A network of roads (approximately 70 miles) associated with past timber harvest provides access (usually via foot or ATV) to hunters from August through December. Recreationists who reach the project area enjoy viewing wildlife and scenery, and hunting big game and waterfowl. Most recreation use takes place along the saltwater bays within and adjacent to the project area, or along the existing road system.

### Recreation Opportunity Spectrum

The Forest Service developed the Recreation Opportunity Spectrum (ROS) system to help identify and describe the variety of recreation settings available on National Forest System lands. The ROS system describes settings that may be affected or changed by various activities, and provides a framework for planning and managing recreation resources. The ROS settings are classified using a scale ranging from Primitive to Urban.

Four different ROS settings are found in the Licking Creek project area. Figure 3-9 shows their location.

**Roaded Natural (approximately 2 percent):** The natural environment of this setting is substantially modified by land use activities. The opportunity to observe and affiliate with other users is common. There is little opportunity for challenge and risk, and self-reliance on outdoor skills is of little importance. The Roaded Natural setting within the Licking Creek project area is located on the far northern end. This area is related to Swan Lake and the power production facilities located there.

**Roaded Modified (approximately 82 percent):** This setting is comprised of a natural environment that has been substantially modified, particularly by vegetative manipulation.

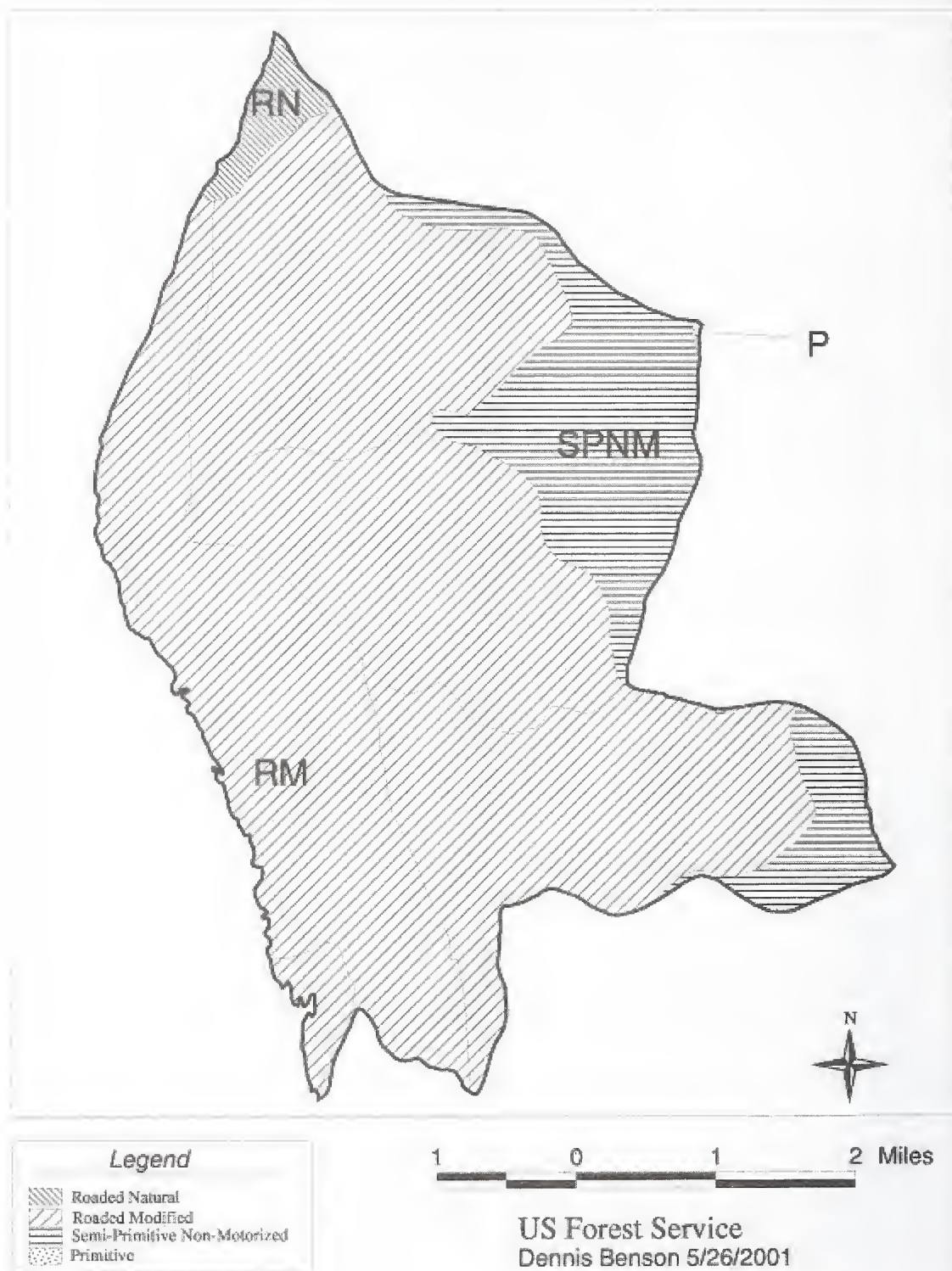
There is strong evidence of roads and/or highways. Frequency of contact is low to moderate. The Licking Creek project area is dominated by this setting. Previous harvest activities and road construction have modified the landscape substantially.

**Semi-primitive Non-motorized (approximately 16 percent):** This setting defines a natural environment where interaction between users is very low and evidence of other users is minimal. This setting makes up the second-largest portion of the planning area. This setting is located along the eastern boundary of the project area, and borders the Misty Fiords National Monument Wilderness. It is mostly high elevation with steep and difficult terrain.

**Primitive (less than 1 percent):** This setting encompasses essentially unmodified natural environment where interaction between users is very low, and evidence of other users is minimal. Motorized use is rare. This area is located along the eastern portion of the project area and is very small. It is related to a much larger primitive area located in the Monument/Wilderness.

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Figure 3-9  
Existing ROS Class Inventory Map on the Project Area



Source: D. Benson, 2001



## Recreation Places

A recreation place is identified as a geographic area having one or more physical characteristics attractive to people engaging in recreation activities; it may contain zero to several recreation sites. These places may be beaches, waterfalls, streams, lakes, scenic features, bays, anchorages, existing and potential recreation sites, and trails. Each recreation place has some activity associated with it such as hiking, camping, hunting, or viewing scenery or wildlife. These recreation places define the inventoried recreation areas, which are important for existing and potential recreation uses.

Three recreation places were inventoried within the project area (Table 3-28). Figure 3-10 shows the location of each recreation place and whether it exists (Existing) and currently receives use, or if there is a potential (Potential) for future use.

**Table 3-28**  
**Recreation Places Within the Licking Creek Project Area**

Recreation Place	Acres	ROS <sup>2</sup>	Recreation Activities	Recreation Sites <sup>3</sup>	FP LUDs <sup>4</sup>
<b>Existing Recreation Places</b>					
1. Marble Creek	209	RM	dispersed camping, hunting	anchorage (E)	ML
2. Shoreline and Estuary	3,494	RM	boating, saltwater fishing, scenic & wildlife viewing	boat dock (P) anchorage (P)	ML
3. Swan Lake <sup>1</sup>	247	RN	lake fishing, boating, picnicking	anchorage (E) boat dock (E)	OG
<b>Potential Recreation Places</b>					
4. Alpine	700	RM, SPNM & P	hiking, hunting, scenic viewing	(N/A)	TM

<sup>1</sup>Swan Lake is located on Carroll Inlet's east shore just north of the project area and is the site of the local power generation source for Ketchikan. The power line crosses Carroll Inlet and then travels south past Shelter Cove to beyond George Inlet.

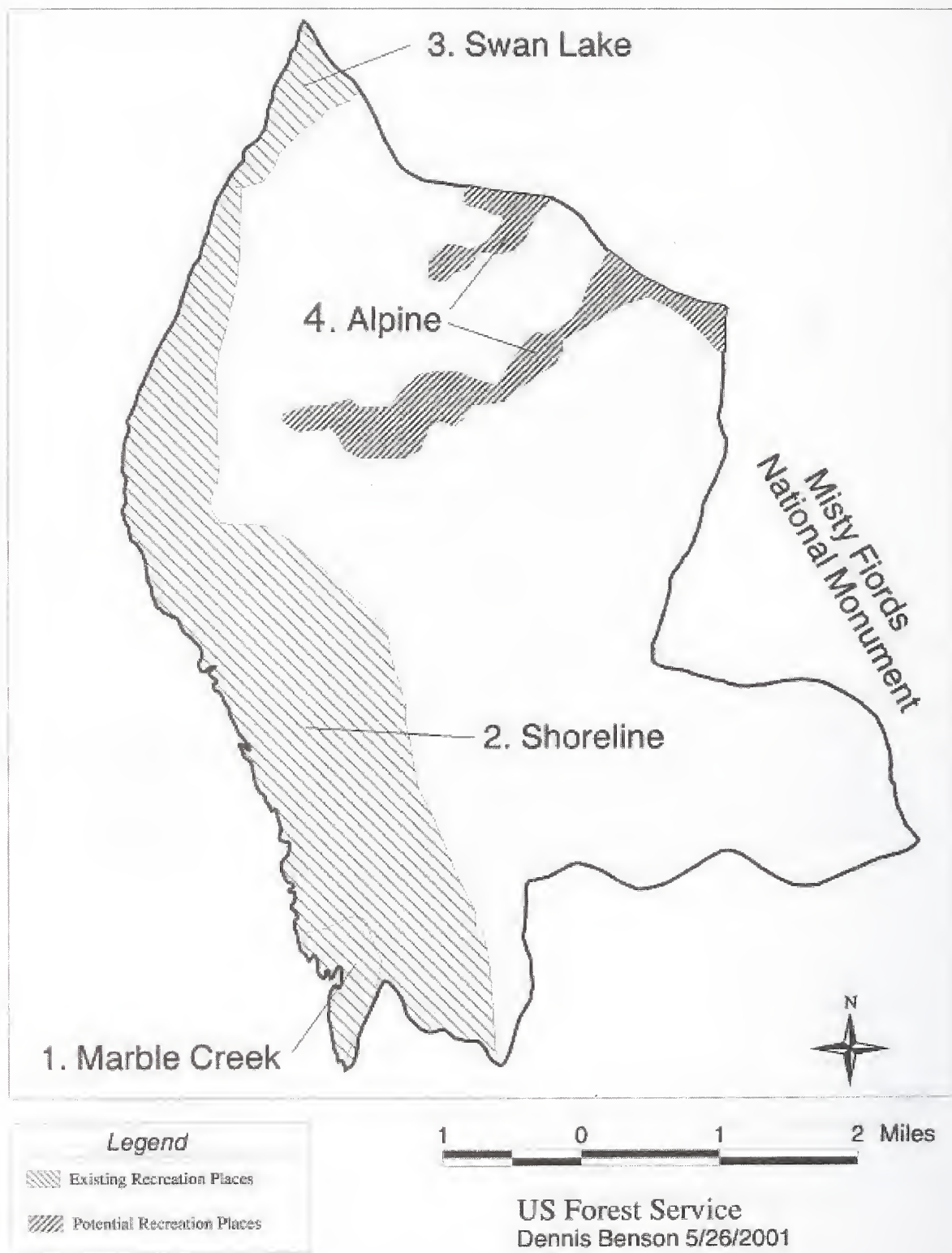
<sup>2</sup> RN = Roaded Natural, RM = Roaded Modified, SPNM = Semi-Primitive Non-Motorized, P = Primitive

<sup>3</sup> (E) = Existing Recreation Site, (P) = Potential Recreation Site, (N/A) = Not Available

<sup>4</sup> Forest Plan Land Use Designations: TM = Timber Production, ML = Modified Landscape, OG = Old-growth Reserve  
Source: D. Benson, 2001

### 3 Environment and Effects

Figure 3-10  
Recreation Places—Existing and Potential on the Project Area



Source: D. Benson, 2001

## Environmental Consequences

### Direct and Indirect Effects

#### Alternative 1

Implementation of the No-action Alternative would leave the lands managed by the Tongass National Forest within the Licking Creek Timber Sale area in a condition similar to what they are today.

**Existing Activities and Use Patterns:** The use of the area as a place where local Ketchikan residents go for day trips and boating excursions would continue. Marine-based recreation activities would not change and the use of the road system by hunters would continue.

**ROS Classification:** Currently, 84 percent of the project area is in the Roaded Natural and Roaded Modified ROS classes. This would remain the same under this alternative. Visitors to the Licking Creek Timber Sale area would have the same experiences they are currently having.

**Recreation Places and Sites:** As for the ROS classification, existing conditions would be maintained under the No-action Alternative. Recreation places within the sale area are mostly undeveloped for recreation use.

#### Alternatives 2 & 3

**Existing Activities and Use Patterns:** The use of the area as a place where local Ketchikan residents go for day trips and boating excursions would continue. Marine-based recreation activities would not change and the use of the road system by hunters would increase slightly with the construction of new roads. About 1.5 miles of new roads (classified and temporary) would be constructed in Alternative 2, and 2.2 miles in Alternative 3. All new roads would be closed after sale activities are completed, but would allow access by foot.

**ROS Classification:** There are subtle differences between Alternatives 2 and 3 and the No-action Alternative. Most of the timber harvest would occur within the current Roaded Modified or Roaded Natural classifications. The greatest impact in these alternatives would be a reduction in the area classified as Roaded Natural (approx. 53 acres) in the northern portion of the sale area. The area classified as Roaded Modified would increase by the same amount. In an area that has undergone major modifications in the past, this is an insignificant change to the landscape. The changes to these ROS classifications would be less than 1 percent.

**Recreation Places and Sites:** Since this area has been extensively harvested, there would be very little impact to the existing conditions. Some modifications would take place along the shoreline, which has been identified as a Recreation Place. However, these modifications would be no more significant than any of the past activities. No recreation sites within this area would be affected by these alternatives.

#### Alternative 4

**Existing Activities and Use Patterns:** The use of the area as a place where local Ketchikan residents go for day trips and boating excursions would continue. Marine-based recreation activities would not change, and the use of the road system by hunters would increase slightly with the construction of new roads. About 5.5 miles of new roads (classified and temporary) would be constructed in this alternative. All new roads would be closed after sale activities are completed, but would allow access by foot.

**ROS Classification:** All of the timber harvest would occur within the existing Roaded Modified classification. Effects on the current ROS classification under this alternative would be insignificant (less than 1 percent).

**Recreation Places and Sites:** Since this area has been extensively harvested, there would be very little impact to the existing conditions. Some modifications would take place along the shoreline, which has been identified as a Recreation Place. However, these modifications

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would be no more significant than any of the past activities. No recreation sites within this area would be affected by this alternative.

## Alternative 5

**Existing Activities and Use Patterns:** The use of the area as a place where local Ketchikan residents go for day trips and boating excursions would continue. Marine-based recreation activities would not change. Although this alternative harvests nearly the same units as Alternative 4, no new roads would be built. As in Alternative 1 (the No-action Alternative), hunters, hikers, and other recreationists would have the same network of roads available to them as they do currently.

**ROS Classification:** As in Alternatives 2 and 3, most of the timber harvest would occur within the current Roaded Modified or Roaded Natural classifications. The greatest impact in this alternative would be a reduction in the area classified as Roaded Natural (approx. 53 acres) in the northern portion of the sale area. The area classified as Roaded Modified would increase by the same amount. In an area that has undergone major modifications in the past, this is an insignificant change to the landscape. The changes to these ROS classifications would be less than 1 percent.

**Recreation Places and Sites:** Since this area has been extensively harvested, there would be very little impact to the existing conditions. Some modifications would take place along the shoreline, which has been identified as a Recreation Place. However, these modifications would be no more significant than any of the past activities. No recreation sites within this area would be affected by this alternative.

## Alternative 6

**Existing Activities and Use Patterns:** The use of the area as a place where local Ketchikan residents go for day trips and boating excursions would continue. Marine-based recreation activities would not change. No new road construction or reconstruction would occur. As in Alternative 1 (the No-action Alternative), hunters, hikers, and other recreationists would have the same network of roads available to them as they do currently.

**ROS Classification:** As in Alternative 4, all of the timber harvest would occur within the existing Roaded Modified classification. Effects on the current ROS classification under this alternative would be insignificant (less than 1 percent).

**Recreation Places and Sites:** Since this area has been extensively harvested, there would be very little impact to the existing conditions. Some modifications would take place along the shoreline, which has been identified as a Recreation Place. However, these modifications would be no more significant than any of the past activities. No recreation sites within this area would be affected by this alternative.

## Cumulative Effects

### Alternative 1

The project area's land use designations are Timber Production and Modified Landscape, and timber sales and road construction are expected to continue. The existing emphasis of Roaded Modified and Roaded Natural ROS classes will gradually increase over time. Existing recreation place settings will reflect this change, and new recreation opportunities associated with roads will likely be present. The planned timber sale activities (Madder and Mop Point/91 Knot) will cumulatively add to this trend. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future, and there would be no additional effects upon recreation place settings.

### Alternatives 2, 3, 4, 5 and 6

The project area's land use designations are Timber Production and Modified Landscape, and timber sales and road construction are expected to continue. The existing emphasis of Roaded Modified and Roaded Natural ROS classes will gradually increase over time. Existing recreation place settings will reflect this change, and new recreation opportunities associated with roads will likely be present. The planned timber sale activities (Madder and Mop Point/91



Knot) and the action alternatives would cumulatively add to this trend, with Alternative 2 having the least effect and Alternative 4 the greatest. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future, and there would be no additional effects upon recreation place settings.

## Roadless Area

### Background

Inventoried Roadless Areas are National Forest System lands that do not have classified roads maintained for travel by motorized vehicles intended for highway use, do not have extensive timber harvest or other developments, and (with certain exceptions) are at least 5,000 acres in area. Nationally, roadless areas have important values and characteristics that are becoming increasingly scarce as other lands are developed. Roadless inventories identify areas that would meet the minimum criteria for inclusion in the National Wilderness Preservation System.

The Roadless Area Conservation Final Rule (Roadless Rule, 36 CFR 294.10, 01/12/01) established prohibitions on road construction, road reconstruction, and timber harvest in inventoried roadless areas on National Forest System lands. The inventoried roadless areas to which these prohibitions apply are identified in a set of maps contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000. (For the Tongass National Forest, these maps correspond closely with the roadless area inventory done for the 1997 Forest Plan.)

In 2003, the Forest Service prepared a final supplemental environmental impact statement (Final Supplemental EIS) to the 1997 Forest Plan EIS to consider roadless areas within the Tongass National Forest for recommendation as wilderness. Appendix C of the Final Supplemental EIS includes documentation of the analysis and evaluation for each inventoried roadless area, and describes the relative contribution each roadless area would make to the National Wilderness Preservation System. The Regional Forester selected Alternative 1 (No Action) as the Selected Alternative (Supplemental EIS Record of Decision, February 2003).

The Licking Creek roadless area analysis is based on both the roadless area map that was used for the Roadless Rule, and the 2003 Inventoried Roadless Areas map prepared for the 2003 Final Supplemental EIS. The 2003 inventory includes the most current land ownership information and new developments (roads, timber harvest, power lines, etc.) implemented since the Roadless Rule.

No timber harvest or road construction is proposed in an Inventoried Roadless Area under any alternative for this project. Since there are differences between the Roadless Rule and the 2003 inventory for the Licking Creek project area, timber harvest and road building were planned to avoid areas shown as roadless on either map.

### Affected Environment

The following technical discussion is based on the Individual Roadless Area #526 description in Appendix C of the Final Supplemental EIS (2003).

### North Revilla Roadless Area

The Licking Creek project area boundary encompasses a small portion of the North Revilla Inventoried Roadless Area (526). For the Roadless Rule, the North Revilla Inventoried Roadless Area was estimated to be 217,818 acres. In the 2003 inventory, more areas were included as part of the inventoried roadless area. In addition, the north end of the project area (Licking Creek drainage) is currently roaded and was excluded from the 2003 inventory. In the Final Supplemental EIS, the North Revilla Inventoried Roadless Area was estimated to be 225,444 acres (Appendix C, Forest Plan Final Supplemental EIS 2003, p. C2-522).

The North Revilla Roadless Area is irregularly shaped, with a number of boundaries that do not follow natural topographic features. Roads and harvest units extend along a number of drainages into the roadless area, affecting the perceived naturalness of the area, as well as its boundaries. The parts of the north portion of the roadless area that adjoin the Misty Fiords National Monument Wilderness might have higher manageability as wilderness. The

developed areas to the south along Carroll Inlet are not suitable for management as wilderness (Appendix C, Forest Plan Final Supplemental EIS 2003, p. C2-529 to C2-530).

In 1977, the Forest Service developed the Wilderness Attribute Rating System (WARS), which was used to inventory the wilderness characteristics of roadless areas during the RARE II process. Using this system, the North Revilla roadless area was given a rating of 22 out of 28 possible points in 1989. In the Final Supplemental EIS (2003), it was given a rating of 20. The lower rating reflects ongoing developments. In the 2003 inventory, the North Revilla roadless area also included areas that were formerly part of the Revilla (524) and Neets (527) roadless areas (Appendix C, Forest Plan Final Supplemental EIS 2003, p. C2-527).

Using the 2003 inventory as a base map, approximately 39 percent of the entire North Revilla roadless area was allocated to a LUD that allows timber harvest and road construction (Timber Production, Modified Landscape, and Scenic Viewshed) in the 1997 Forest Plan. The remainder was allocated to non-development LUDs (Appendix C, Forest Plan Final Supplemental EIS 2002, p. C2-524). All but about 3 percent of the Licking Creek project area was allocated to Timber Production and Modified Landscape LUDs in the 1997 Forest Plan.

Approximately 3,157 acres of the Licking Creek project area were in roadless area, as mapped for the Roadless Rule (Figure 3-11). The 2003 inventory increased the roadless area to 6360 acres within the Licking Creek project area (Figure 3-12).

Roads were constructed within the Licking Creek drainage, and within the roadless area, under timber sale contracts sold prior to the 1997 revision of the Forest Plan. This area on the north side of the project area has been substantially altered, no longer meets the criteria of a roadless area, and was excluded in the 2003 inventory.

The areas that were added to the roadless area (in the 2003 inventory) include the middle portions of the Marble Creek and Calamity Creek drainages. The headwaters of Marble Creek and Calamity Creek border Misty Fiords National Monument and make up the southern section of the roadless area. These unroaded portions consist of steep and rugged terrain. There are no unique values to this area. The lower portions of these drainages have been roaded and harvested through past activities.

## Environmental Consequences

No harvest units or road building are proposed under any of the alternatives within the North Revilla Inventoried Roadless Area, as mapped in the 2003 inventory. No roadless area subject to the Roadless Rule would be affected. The proposed actions would not have any direct effects on the Inventoried Roadless Area.

However, timber cutting and road building may have an indirect effect on the roadless area. For the 2003 inventory, a 1,200-foot buffer was applied to all existing roads, and a 600-foot buffer was applied to all recently harvested units. A few of the proposed harvest units with associated roads adjoin the roadless area boundary, as mapped in 2003 (Figure 3-12).

Depending on the criteria used to conduct a future roadless inventory, the roadless area boundary could be adjusted to reflect the new activities, and the roadless area acreage may be reduced by a small amount. This would affect no more than 223 acres (less than 1 percent) of the inventoried roadless area, as mapped in 2003, under any alternative. No acres of roadless area subject to the Roadless Rule would be affected (Figure 3-11).

These reductions would be adjacent to developed areas, and would not impact areas with high apparent naturalness or opportunities for solitude. Due to their location and small size, this reduction would not affect the eligibility of the North Revilla Inventoried Roadless Area for future consideration for wilderness designation (Appendix C, Final Supplemental EIS 2003).

## Licking Creek Project Area

## Direct, and Indirect Effects

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## Cumulative Effects

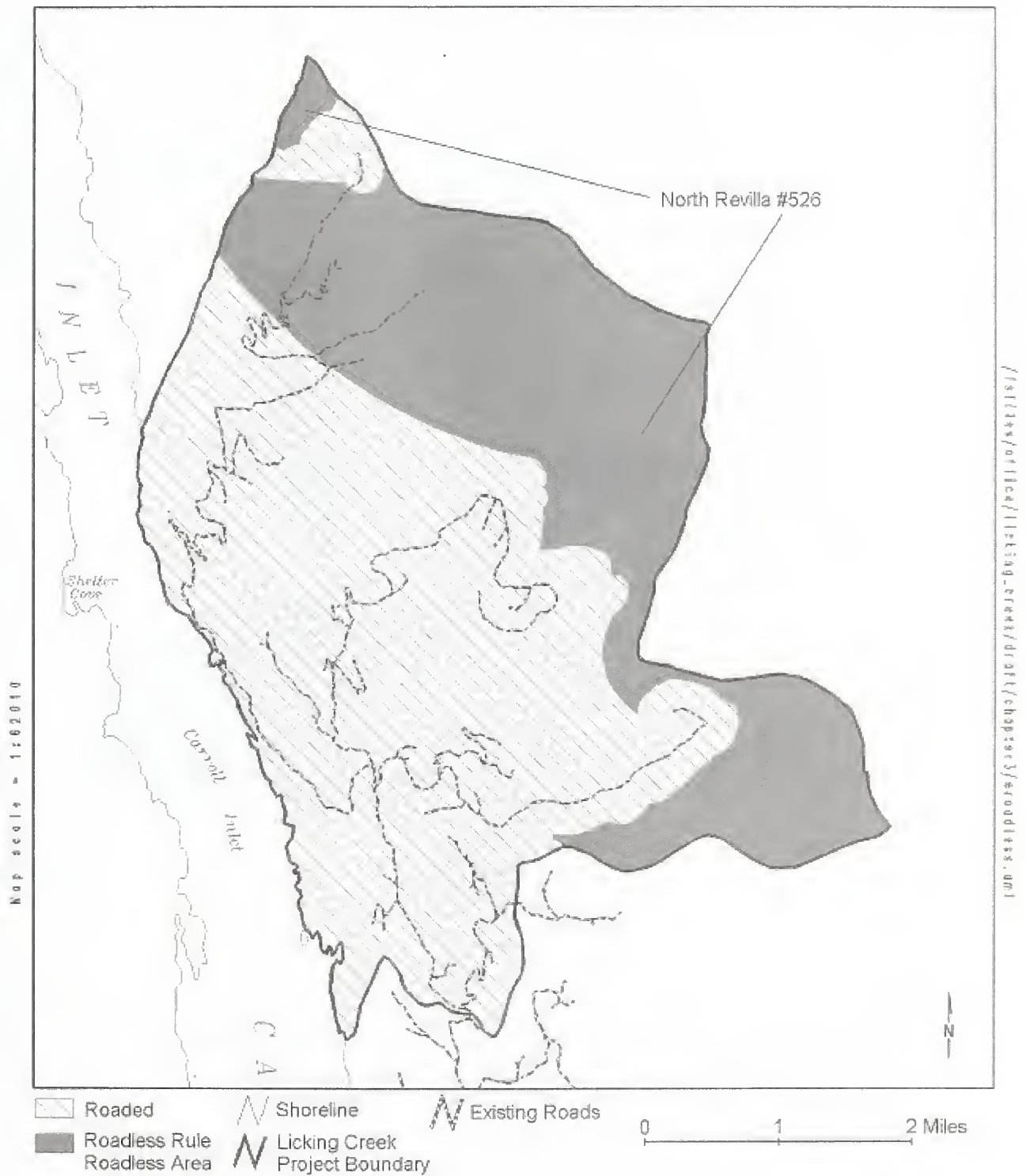
The Madder Timber Sale is planned to harvest timber and build roads within the North Revilla Inventoried Roadless Area, as it was mapped in 2003. (This sale has a signed NEPA decision and is scheduled to be sold.) This activity is located near Carroll Inlet, the western boundary of the project area (Figure 3-12). The sale will reduce the inventoried roadless area by 348 acres, as mapped in 2003. Cumulatively, this sale and the Licking Creek alternatives would affect no more than 571 acres (less than 1 percent) of the roadless area under any alternative. No acres of roadless area subject to the Roadless Rule would be affected (Figure 3-11).

These reductions would be adjacent to developed areas, and would not impact areas with high apparent naturalness or opportunities for solitude. Due to their location and small size, this cumulative reduction would not affect the eligibility of the North Revilla Inventoried Roadless Area for future consideration for wilderness designation (Appendix C, Final Supplemental EIS 2003).

The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. Due to its location, road access for any future sale would be entirely within roaded areas, and would not affect any inventoried roadless area or area subject to the Roadless Rule.

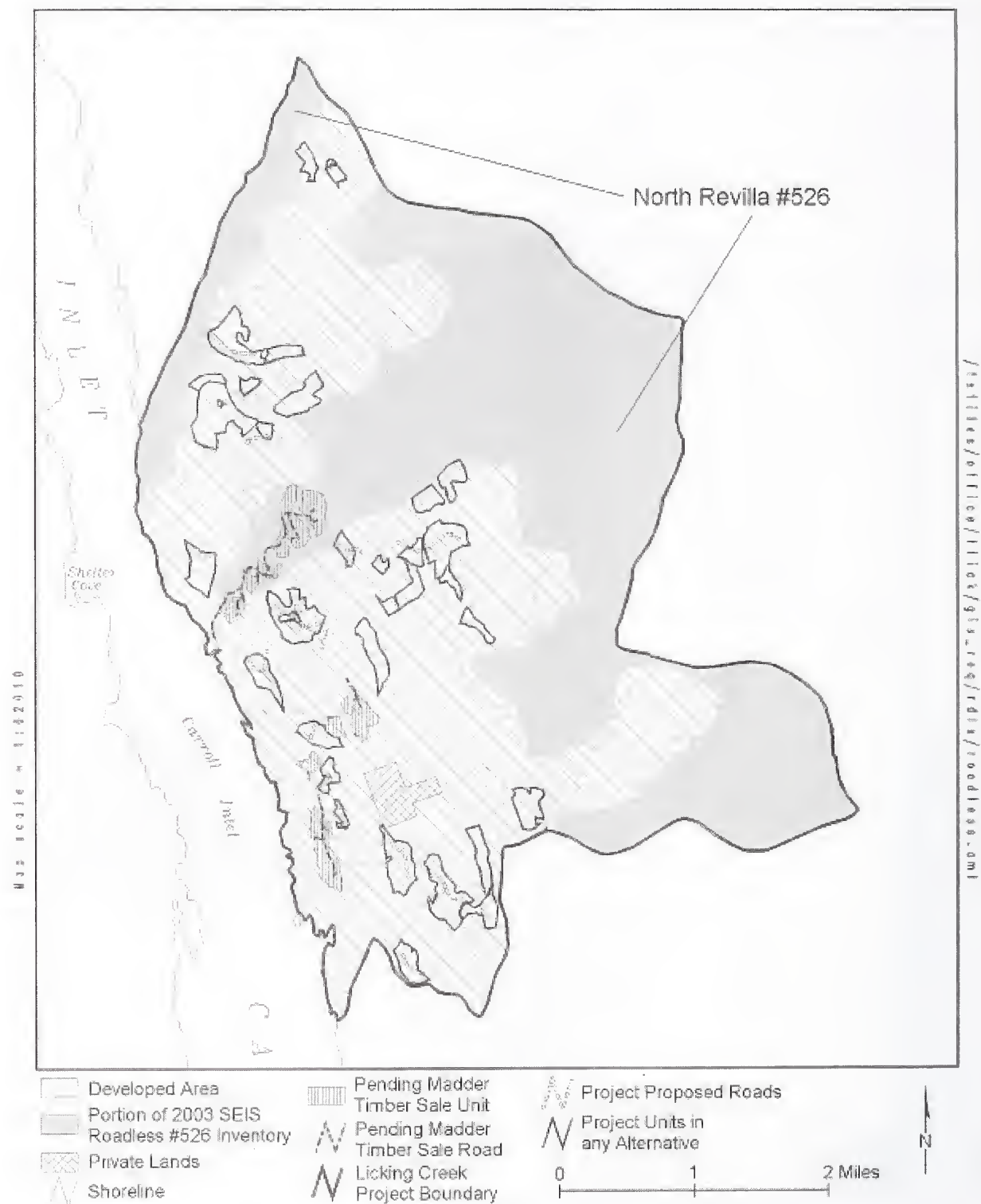


Figure 3-11  
Roadless Area (as mapped for the Roadless Area Conservation Rule) and Existing Roads on the Project Area



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Figure 3-12  
2003 Inventoried Roadless Area and Proposed Units and Roads on the Project Area



Source: J. Llanos, 2003

## Scenery

This analysis is summarized from the Scenic resource report for the Licking Creek project area. This report is tiered to the Forest Plan Final EIS, Chapter 3 and Forest Plan, Chapters 3 and 4 and Appendix F. In addition to the text given below, several visual simulations are illustrated in Appendix E (Figures E-2 through E-15) of this Final EIS.

## Affected Environment

### Landscape Character of the Project Area

The Licking Creek project area is viewed primarily from Carroll Inlet, a long narrow fiord that extends from Revillagigedo Channel, near the mouth of George Inlet, into the interior of Revillagigedo Island. Carroll Inlet is primarily used by local residents, who boat up the fiord to fish for crab and shrimp and to hunt along much of the shoreline. Carroll Inlet is the one Visual Priority Travel Route identified in the Forest Plan for this project area. The inlet is used entirely by local residents who boat there to hunt or fish.

The landscape around the project area consists of a series of blocky ridges dissected by several winding and twisting drainages. The ridge summits are broad and rounded, and generally start about 2 miles back from the shore of Carroll Inlet. They range from about 2,000 feet to almost 3,000 ft. at the back of the various drainages. The valleys between these ridges are generally U-shaped. The landscape along the shoreline of Carroll Inlet is characterized by low, rolling to almost flat terrain, except for a long, steep 1,000-foot ridge that rises from the saltwater just south of the mouth of Licking Creek. This landscape is fairly typical of most of Carroll Inlet and nearby Thorne Arm and George Inlet. Just north of the project area, the mountain terrain becomes higher, steeper and more rugged.

The scenic quality of a project area landscape is partly based on the diversity of landform, vegetation, water features and rock forms it exhibits relative to the much larger landscape character type in which it is located. This project area is part of the Coastal Hills character type. This is one of five broad geographic regions in Southeast Alaska described in the National Forest's original visual management system that serve as frames of reference for inventorying scenic quality. The National Forest scenic management system rates landscapes as Class A (distinctive landscape diversity), Class B (common degrees of diversity), or Class C (very low degree of diversity). Because the scenic diversity within the Licking Creek project area landscape is similar to that of most of the Coastal Hills character type, the Forest's scenery resource inventory rates it as a Variety Class B.

### Project Area Viewpoints

To analyze the scenic impacts of a proposed timber sale, we identify the recreation use areas, travel routes and residential and urban areas from which the project may be viewed (viewsheds), and then describe the landscapes seen from these areas. As noted above, Carroll Inlet is the primary recreational use area in the vicinity of this project.

Three viewpoints along Carroll Inlet, adjacent to the project area, were chosen for this analysis. These are Viewpoint 1, just north of the mouth of Licking Creek; Viewpoint 2, just opposite the mouth of Calamity Creek; and Viewpoint 3, just north of the mouth of Marble Creek (see Figure E-1 in Appendix E). Viewpoint 2 consists of two separate viewing angles: 2a, looking to the northeast, generally up the Calamity Creek valley; and 2b, a view just to the south of the Calamity Creek valley. Viewpoint 3 also consists of two separate viewing angles: 3a, a view to the northeast toward the major ridge between Marble Creek and Calamity Creek; and 3b, a view to the east toward a long, low ridge south of Marble Creek.

### Existing Visual Condition From These Viewpoints

Extensive harvest has occurred throughout much of this project area and has been spread throughout each of the past four decades. A few scattered spots along the shore were harvested



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in the late 1950s to early 1960s, and currently are vegetated with thick, dark green second growth (Viewpoints 1 and 2a, Figures E-2 & E-4, Appendix E). Extensive harvest occurred in the 1970s on the slopes just back from the shore between Calamity Creek and Marble Creek, and further up the Marble Creek drainage. These harvest areas have greened up, but not to the extent of the 1960s harvest (Viewpoints 2b and 3a, Figures E-7 & E-10, Appendix E). Additional harvest took place in these drainages in the 1980s. In the early- to mid-1990s several units were harvested on the ridges and slopes between Licking Creek and its southern tributary. Much of this harvest is hidden by intervening landforms, except for a couple of units on the upper southeastern slopes above Licking Creek (the left side of Viewpoint 1, Figure E-2, Appendix E).

The combination of the larger-scale older harvest and the more recent harvest areas scattered throughout this viewshed results in a moderately to heavily altered scenic condition from many viewpoints. This level of impact is found primarily in the middleground portion of the viewshed. This zone consists of the slopes and ridges roughly between 1/2 and 5 miles from the viewing positions. (See the zones labeled "mg" on the map in Figure E-1, Appendix E). Viewpoint 1 is an example of a more moderate level of impact that is created by the ridge-top units mentioned above. These units, though large, tend to blend well with the terrain (Figure E-2, Appendix E). The landscape seen from Viewpoint 3a is more heavily altered due to the large-scale older harvest to the left of the view, and the large blocky more recent harvest to the right of the view (Figure E-10, Appendix E). The landscape viewed from Viewpoint 3b is moderately altered, due primarily to the recent harvest on the ridgetop in the middle of the view, the large area of old, regenerated clearcuts on the right side of the view, and the large area of old, regenerated clearcuts on the right side of the view (outside of the project area). A small parcel of old harvest on private land on the north end of the ridge adds minimally to the overall impact of all the past harvest (Figure E-13, Appendix E).

The foreground portion of the viewshed is the area between the shoreline and the ridgeline that follows the first set of knolls and ridges just back from the shore. (See the zone labeled "fg" on the map in Figure E-1, Appendix E). This part of the viewshed is, for most part, only slightly altered. Most of the impacts in this foreground zone are from older units that have substantially regenerated since they were logged about 40 years ago (Figures E-2 and E-4, Appendix E).

#### Visual Quality Objectives

The Forest Plan expresses the desired condition for National Forest System lands in terms of visual quality objectives (VQOs). These describe the amount of alteration, when looking across a landscape, for which we are to manage. VQOs are linked to the land use designations (LUDs - see Chapter 1). These VQOs are applied to the landscapes viewed from Visual Priority Travel Routes and Use Areas, which are identified in the Forest Plan. Carroll Inlet is the one Visual Priority Travel Route in the Licking Creek project area. The Forest Plan assigned the following VQOs for the Licking Creek area:

- **Maximum Modification:** management activities may dominate the characteristic landscape, but will at the same time use naturally established form, line, color and texture. They should appear as natural occurrences when viewed from over 5 miles away.
- **Modification:** management activities may dominate the characteristic landscape, however, they must borrow from natural form, line color, and texture so completely and at such a scale that the visual characteristics of the activity are those of natural features of the surrounding area.
- **Partial Retention:** management activities may be evident but are subordinate to the characteristic landscape.

In upper Carroll Inlet, the Forest Plan allocates the foreground to the Modified Landscape LUD. Hence, the VQO within the foreground zone is Partial Retention (see map in Figure E-1, Appendix E). Much of the foreground viewshed meets the Partial Retention objectives, since



the only alterations to the natural landscape character include a few scattered 40-year-old heavily regenerated units that are starting to blend into the remaining landscape. (See Figures E-2 and E-4, Appendix E).

Most of the middleground viewshed in this project area is allocated to Timber Production. The VQO for these areas is Maximum Modification. The one exception is the middleground ridge seen between Calamity and Marble Creeks, which is allocated to Modified Landscape. The VQO in this portion of the viewshed is Modification. This portion of the landscape meets the standards for a Modification VQO from most viewpoints. From Viewpoint 3a in optimum afternoon lighting conditions, the impacts on this ridge appear somewhat greater, due to the greater visibility of the blocky unit to the right of the view that was cut in the mid 1980s, but still meets the Modification VQO. In the remaining middleground portions of the Carroll Inlet viewshed, past harvest activities at least meet the standards for the Forest Plan adopted VQO of Maximum Modification VQO, and from many viewpoints meet a Modification VQO (Figures E-2, E-5, E-8, and E-14, Appendix E).

## Environmental Consequences

### Direct and Indirect Effects

The following section describes the effects that the action alternatives would have on the scenic condition of the above viewsheds. We based this assessment on the design measures and harvest treatments prescribed for certain critical units. Appendix E includes visual photo simulations from five viewpoints (Figures E-2 through E-15). The locations of these viewpoints are shown on the map accompanying these photos (Figure E-1, Appendix E). These simulations display what the proposed harvest may look like for these particular units. On the ground, factors such as topography, slope, streams and location of reserve trees may cause the actual harvest units to look slightly different from the simulations. Table 3-29 summarizes the units visible from each viewpoint.

**Table 3-29**  
**Summary of Units Visible from Viewpoints**

Viewpoint	Alt. 1	Alt. 2	Unit Number by Alternative			
			Alt. 3	Alt. 4	Alt. 5	Alt. 6
1	0	12	9, 10, 12	9, 10	9, 10, 12	10
2a	0	0	22, 24	19, 24, 43	19	19
2b	0	63	40, 63	40, 44, 63, 67, 71	40, 44, 63, 67, 71	0
3a	0	0	40	40, 43, 50	40, 50	50
3b	0	0	0	67, 71	67, 71	67

Source: J. Short, 2002, 2003

### Alternative 1

If this alternative were selected, no additional visual impacts would be created between Licking Creek and Marble Creek. Existing past harvest areas would continue to regenerate to a point where recently harvested units would begin to green up, and older harvested areas would continue to establish more of a forested texture. In about 20 years, the portion of the viewshed from Calamity Creek to just north of Marble Creek (seen most clearly from Viewpoint 3a, Figure E-10, Appendix E), would be close to meeting a Partial Retention VQO. The landscapes north of Calamity Creek would generally reach a Partial Retention VQO, since the

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ridgetop units harvested in the 1990s would have enough texture so that they would not dominate the landscape (Viewpoint 1, Figure E-2, Appendix E).

## Alternative 2

Under this alternative, very few units would be harvested that would increase the scenery impacts in the viewshed between Licking Creek and south of Marble Creek. At the north end of the project area viewshed, the upper portion of Unit 12 would be visible from Viewpoint 1. North and south of this viewpoint, Unit 12 would disappear from view. The impact of this one new unit and the existing harvest on the ridges to the north would meet a Modification VQO. At the south end of the viewshed, the east half of Unit 63 would be seen from Viewpoint 2b (Figure E-9, Appendix E). The impact of this unit and the existing harvest would meet a Modification VQO.

## Alternative 3

At the north end of the project area, portions of units 9, 10, and 12 would be visible from Viewpoint 1. The impacts of Unit 10 would be mitigated by a large retention area on the east slopes above the stream cutting through the western side of the unit. This retention is intended to protect some karst features. This retention and the adjacent stream buffer would create a peninsula of trees that would break up the scale of this unit (see Figure E-3, Appendix E). The combined impacts of Units 9, 10 and 12 and the recently harvested areas would meet the Forest Plan VQO of Maximum Modification.

In the middle portion of the viewshed, two units (40 and 63) would be partially visible from Viewpoints 2b and 3a. Unit 40 would harvest the top of a ridge directly facing these viewpoints (Figures E-9 and E-12, Appendix E). This unit would be visible as a narrow band of harvested ground along the top of the ridge, which would be somewhat screened by reserved areas in the southern portion of the unit and scattered retained trees in other portions of the unit. Unit 40 would be slightly more visible from Viewpoint 3a than 2b, and would add slightly to impacts created by the existing harvest. However, from most of the viewpoints between 2b and 3a, the impact of this unit and the regenerating second growth would be consistent with the Forest Plan VQO of Modification. As in Alternative 2, a portion of Unit 63 would also be visible from Viewpoint 2b. The impact of Unit 63 in combination with the older harvest would easily meet the Maximum Modification VQO that applies to the rest of the middleground viewshed.

No additional impacts to the view from Viewpoint 3b would be created by this alternative.

## Alternative 4

In this alternative, impacts in the north part of the viewshed (Viewpoint 1) would be slightly less than in Alternative 3 by omitting Unit 12. Units 9 and 10 would be harvested with the same prescription as described for Alternative 3.

In the middle part of the viewshed (seen from Viewpoints 2a, 2b, and 3a), the impacts would be slightly greater than those described for Alternative 3. This alternative adds two units, 19 and 44, on the foreground slopes on either side of the mouth of Calamity Creek. Only a small portion of Unit 44 (on top of a knob) would be visible. Impacts from Unit 19 would be mitigated by partial-cut harvest of the steep slopes facing south and southwest. Only the northwest corner of the unit, just below an existing road, would be clearcut. The overall impact of Units 44 and 19, along with the well-established texture in the old harvest areas just above the shore, would meet the guidelines for the Forest Plan VQO of Partial Retention for the foreground portion of the viewshed (Viewpoint 2a, Figure E-6, and Viewpoint 2b, Figure E-9, Appendix E).

This alternative includes Unit 40, described above under Alternative 3 (Viewpoint 3a, Figure E-12, Appendix E). In addition to Unit 40, this alternative adds two middleground units, 43 and 50, which would be seen from Viewpoints 2a or 3a. Unit 43 encompasses a pair of small knobs. This unit configuration reduces the amount of clearcut edges that would be visible, softening to a degree the impact of the unit. (It would be visible at the right side of Viewpoint

2a and the left side of Viewpoint 3a.) A portion of Unit 50, as well as Units 40 and 43, would be visible from Viewpoint 3a. All three of these units would add a moderate amount of impact to that created by the existing harvest. However, the impact of this harvest would be consistent with a Modification VQO adopted for the ridge between Calamity and Marble Creeks (Figure E-12, Appendix E).

In the southern part of this project area, this alternative adds two units on an elongated landform that extends south of the Marble Creek drainage. Unit 67 faces Carroll Inlet, and would be bisected by an extra-wide riparian buffer on the stream running through the unit. Some scattered clumps of trees, retained to meet Marten Standards and Guidelines, may also soften the impact of the unit. Unit 71 straddles the top of the landform and would be hidden from view, except for the south-southwest corner, which lies on the gentle west-facing slopes. A corridor of old growth lies between these two units. This harvest in combination with the existing harvest on the top of this low ridge would be consistent with the standards for the Maximum Modification VQO assigned to this Timber Production area (Figure E-15, Appendix E).

## Alternative 5

This alternative is very similar to Alternative 4 with the following exceptions:

- This alternative does not include Unit 43 that would be visible from Viewpoints 2a and 3a, and the impacts would be slightly less from these viewpoints.
- This alternative includes both Units 10 and 12, which would be visible from Viewpoint 1. Therefore, the impact from this viewpoint would be identical to Alternative 3 and slightly greater than in Alternative 4, but well within the guidelines for the Maximum Modification VQO.

## Alternative 6

This alternative overall would create much less visual impact than Alternatives 3, 4 or 5 (Table 2-28). At the northern end of the project area (Viewpoint 1), Unit 10 would be slightly smaller since trees would only be harvested from the existing road. Hence, the impact would almost meet a VQO of Modification.

In the middle portion of the project (primarily seen from Viewpoints 2a, 2b and 3a), the visual impacts of Alternative 6 would be significantly less than Alternatives 3, 4 and 5, since several units are dropped in this alternative. Unit 19, visible from Viewpoint 2a, would be much smaller than in the other alternatives. Although it would not include a partial-cut component as in the other alternatives, it would still incorporate the same retention areas on the steeper slopes. Therefore, in the foreground, the Partial Retention VQO would be met. There would be no additional impacts in the foreground or middleground from Viewpoint 2b. From Viewpoint 3a, only Unit 50 would create a slight impact. Therefore, from Viewpoints 2b and 3a, the Forest Plan VQOs of Partial Retention and Modification would be met.

In the southern portion of the project area (Viewpoint 3b), Unit 67 would be reduced in size by eliminating roughly the upper half of the unit. The resulting impact would appear as a fairly narrow harvested strip at the bottom of the slope in the middle of this view. This level of impact would meet the Modification VQO.

## Cumulative Effects

### Alternative 1

In addition to the present visual condition created by past timber harvest within the project area, there will be additional impacts created by a series of Madder timber sale units that have been sold but not yet logged. These will add slight impacts to the landscape seen from Viewpoints 2a, 2b, 3b, and moderate impacts to the landscape seen from Viewpoint 3a. In Viewpoint 2a, a pair of small units just above Calamity Creek will expose some harvest ground on two small knobs in the middle of the view (Figure E-5, Appendix E). In Viewpoint 3a, a long clearcut at the base of a blocky ridge will be clearly visible between the old harvest and the more recent rectangular unit at the right of the view (Figure E-11, Appendix E). The view



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from this viewpoint currently meets the Modification VQO; however, it will not quite meet the Modification VQO when the large Madder unit is added to the existing harvest. This unit is also slightly visible from Viewpoint 2b (Figure E-8, Appendix E). A long narrow Madder unit will appear as a sliver of exposed harvested ground at the base of the slope seen in Viewpoint 3b (Figure E-14, Appendix E).

Assuming the Madder units are cut, in about 10 years these units will be fully greened up, as will the recently harvested units at the north end of the project area. The older harvest areas will have additional forested texture established in them. Most of the project area will be in a slightly altered condition, except for the ridge between Calamity and Marble Creek, which will be in a moderately altered condition.

No impacts to scenery are anticipated from the Mop Point/91 Knot and, as it will involve one small (less than 10 acre) unit from the existing road system.

## Alternative 2

At the north end of the viewshed, the landscape seen from Viewpoint 1 will not be impacted by any Madder units. Proposed Unit 12 is the only additional impact that would be seen from this viewpoint. From Viewpoint 2b, a small portion of one Madder unit will be seen in combination with Unit 63, which sits on a slope further to the south. The cumulative impact of this unit, the Madder unit, and the existing harvest would meet a Modification VQO.

## Alternative 3

The combined impacts of Units 9, 10 and 12 and the recently harvested areas would meet the Forest Plan VQO of Maximum Modification.

In the central part of the project area viewshed, Unit 40 would be visible from Viewpoint 2b in combination with a very small portion of one Madder unit at the base of a slope below Unit 40. This same Madder unit will be highly visible from Viewpoint 3a, where Unit 40 would also be seen with it. From most of the Carroll Inlet boat route in the central portion of the project area, the cumulative impact of the existing harvest, the proposed Licking units, and the Madder units would be consistent with the Forest Plan VQO of Modification; however, it would not quite meet the Modification VQO from Viewpoint 3a. From Viewpoint 3b, no proposed units would add to the impacts.

## Alternative 4

The overall impact of Units 44 and 19, along with the well-established texture in the old harvest areas just above the shore, would meet the guidelines for the Forest Plan VQO of Partial Retention for the foreground portion of the viewshed (Viewpoint 2a, Figure E-6, and Viewpoint 2b, Figure E-9, Appendix E). From Viewpoint 2a, the cluster of Madder units in the middleground will be seen in combination with Unit 43. From Viewpoint 3a, Units 50, 40 and 43 would add slightly to the impacts created by the existing harvest and the long Madder unit. From most of the Carroll Inlet boat route in the central portion of the project area, the cumulative impact of the existing harvest, the proposed Licking units and the Madder units would meet the middleground Modification VQO (Figures E-6 and E-9, Appendix E). However, the cumulative impact would not quite meet the Modification VQO from Viewpoint 3a.

In the southern part of this project area, the combined impacts of Units 67 and 71, the regenerating second-growth on adjacent forest lands, the old harvest on the small parcel of private land, and the long narrow Madder unit below Units 67 and 71 would be consistent with the guidelines for the Forest Plan VQO of Maximum Modification that applies to this portion of the middleground viewshed (Viewpoint 3b, Figure E-15, Appendix E).

## Alternative 5

The cumulative impacts at the northern end of the project area (Viewpoint 1) would be the same as for Alternative 3, while cumulative impacts throughout the rest of the project area would be the same as for Alternative 4, except that Unit 43 is not included in this alternative.



## **Alternative 6**

In the northern part of the project area, the combined impact of past harvest and the smaller Unit 10 would come close to meeting a Modification VQO.

In the central part of the project area, Alternative 6 units would add very little additional impact to the cumulative effects created by past harvest and the yet-to-be-harvested Madder sale units.

In the southern part of the project area, the combined impacts of past Forest Service harvest, the small area of private land harvest at the northern end of the ridge seen from Viewpoint 3b, the long narrow Madder unit, and the reduced size of Unit 67 would meet a Modification VQO.

**For all action alternatives** (except Alternatives 2 and 6), about 10 years after harvest all harvest units, the Madder units (assuming they are harvested soon), and the remaining recent harvest would have greened up and reduced the visual contrast to a point that would bring most of the project area to a moderately altered condition. In 30-40 years, all the recently harvested areas would have regained enough forested texture so that much of the project area would be brought to a slightly altered condition. Within another 20 to 30 years, the area would return to a near-natural visual condition.

In Alternatives 2 and 6, after about 10 to 20 years, much of the viewshed seen from all the identified viewpoints would be in a slightly altered condition.

## Silviculture and Timber Management

Silviculture is the science of managing forest vegetation, primarily through the application of timber harvest prescriptions. The Biodiversity and Old Growth section of this chapter discusses aspects of old-growth forest not related to forest products. Additional background on forest land classification, silviculture, logging systems, and other topics may be found in the Forest Plan (Chapter 3, "Timber" and Appendix G) and in the Licking Creek resource reports for silviculture and timber management.

### Affected Environment

#### Forest Vegetation

The natural vegetation of the Licking Creek project area is a mixture of coniferous forest interspersed with muskeg (bog), shrubland and riparian plant communities. The Forest Service has developed a regional plant association guide to classify different forest types. This classification helps to provide an inventory of resources and serves as a management guide. The project area contains all seven forested vegetation series that are commonly found throughout southern Southeast Alaska. These vegetation series are grouped by the dominant overstory species and are as follows: Sitka spruce, western hemlock, mountain hemlock, western hemlock-yellow cedar, western hemlock-western red cedar, mixed conifer and shore pine series. These vegetation series are further divided into plant associations, which include the understory vegetation.

Table 3-30 shows the dominant plant associations for forested land identified in the project area unit pool, in order of frequency found in percentage of project area unit pool.

Table 3-30  
Plant Associations and Abundance in the Licking Creek Project Area Unit Pool

Plant Association	Plant Association #	Coverage in Project Area Unit Pool (%)
Western Hemlock/Blueberry/Devil's Club	100140	19
Mixed Conifer/Blueberry /Deer Cabbage	400430	11
Western Hemlock/Blueberry/Skunk Cabbage	100130	9
Mountain Hemlock/Blueberry	500510	8
Western Hemlock/Blueberry	100110	7
Mixed Conifer/Blueberry/Skunk Cabbage	400420	7
Western Hemlock/Blueberry/Shield Fern	100120	5
Mixed Conifer/Blueberry	400410	4
Western Hemlock-Western Red Cedar/Blueberry/Skunk Cabbage	700730	4
Other plant associations found in minor abundance		36

Source: Stand exam data: 2000, 2001

The forested lands in the project area are a mixture of mature, unharvested stands and second growth following previous timber harvest or recent natural disturbances. All stands proposed for harvest are mature and beyond the age of maximum average annual growth of the stand. Most are representative of uneven-aged western hemlock, cedar and spruce stands that commonly need over 100 years to develop under natural conditions.

## Forest Health and Natural Disturbance

### Wind Disturbance

Wind is the major disturbing influence within the project area. Overall, however, windthrow has been minor to moderate throughout the project area, with the heaviest occurrences along the edges of previously harvested units.

Stands occurring on wind-exposed slopes, especially those with a southern exposure, seem to have frequent storm intervals that restrict forest development to the first three stages of development: stand initiation, stem exclusion, and understory reinitiation. By contrast, the final stage of stand development, old growth, usually occurs in wind-sheltered areas on the north-facing slopes of ridges and mountains, since the dominant strongest winds come from the south.

On the wind-exposed, south-facing slopes, the most common progression of stand development starts with partial disturbance, with most of the trees blowing down and leaving varying numbers of legacy trees (residual trees following a blowdown event). Over time, seedlings invade the openings created by the wind event. Due to the frequency of the storms, the stand becomes partially disturbed again. Many stands never develop more than three age classes, as the oldest age class continually blows over in major storm events.

On the protected north-facing slopes, where there is relatively infrequent disturbance, individual trees senesce (mature) and die. These individual trees create gaps in the canopy where seedlings will invade. Other single trees in the stand will senesce, die and create still more gaps in the canopy with seedlings filling the open gap in the canopy. This is called gap-phase dynamics. This eventually leads to true old-growth conditions.

Clearcuts mimic natural processes and are sometimes prescribed in topographic locations that are most susceptible to recurring, large-scale wind disturbance, such as the south/southeast facing slopes, ridge noses, and hilltops. In these locations, and adjacent to previously harvested stands, the edges of the residual stand are more susceptible to wind damage. Steps, such as feathering unit edges or modifying the unit shape, can be taken to minimize the windthrow potential. Uneven-aged management is most successfully prescribed in wind-protected landscapes, where small-scale, gap-phase dynamics naturally occur (Nowacki and Kramer 1998).

### Dwarf Mistletoe

Dwarf mistletoe reduces the vigor and growth rate of hemlock and often produces a low quality of timber. Cankorous swellings often occur at the point of infection on limbs and main stems. These cankers offer an entrance for wood-destroying fungi, which can lead to heart rot. The occurrence of dwarf mistletoe within the project area varies widely. Mistletoe infections are minor to moderate in most areas, affecting one-third to two-thirds of the hemlock within the stands. More severe infections occur in small, scattered areas within the project area, but have not been widespread.

Dwarf mistletoe progresses relatively slowly in Southeast Alaska; however, with stands which are partially harvested, there may be some infected trees. The infected trees should be removed if the desired future condition is to eliminate infected trees in the residual stand and to prevent the spread of mistletoe to the regenerated stand.

Trees infected with mistletoe may have some inherent value to certain wildlife species. In some instances, it may be beneficial to retain severely infected trees to maintain and/or provide wildlife habitat.

### Alaska Yellow Cedar Decline

Alaska yellow cedar decline is an occurrence that causes considerable mortality in Southeast Alaska. Mortality can be in small patches or can cover expansive areas. Affected trees may die more quickly (2 or 3 years), or more slowly over a 15-year or longer period with crowns progressively thinning. The cause of Alaska yellow cedar decline is not completely understood. The disease is generally associated with boggy conditions, usually near muskegs.

### 3 Environment and Effects

#### Forest Land Classification

The primary cause of mortality is unknown, and no single factor has been shown to be primarily responsible for tree death (Hennon et al., 1990).

The Licking Creek project area has some occurrence of cedar decline, especially in lower-volume, less-productive sites. The disease appears to be affecting scattered, small patches, rather than affecting large, expansive areas. The proposed harvest units that do have cedar decline may have the Alaska yellow cedar salvaged from the stands. There may be some problems in adequately restocking those stands with Alaska yellow cedar; however, the decline has little or no direct influence on regeneration of other species.

#### Decay Fungi

There is evidence of decay fungi throughout the study area. These populations of fungi cause timber volume loss, and impact growth and yield. Many decay fungi enter through tree wounds.

Stands of trees that are healthy and in a balanced mix of age classes, from very young to harvestable age, are a key part of the desired condition for managed forested lands. The Forest Plan provides a classification scheme that identifies the amount of forested lands that are capable of, and available for, timber production.

*Non-forested land* is not capable of timber production, and includes areas of bare rock, alpine meadows, muskeg wetlands, and soils that only support scrub timber.

*Commercial forest land* is land that can produce 20 cubic feet of tree growth annually, and/or must contain at least 8,000 board feet of net timber volume per acre.

*Suitable forest land* is land that is physically suitable for timber harvest, can be adequately restocked in 5 years, and has been identified in the Forest Plan as within a land use designation that has timber available for timber management. In addition, Forest Plan Standards and Guidelines identify areas that are excluded from timber harvest to meet other resource concerns. These include beach fringe, wildlife nest or den buffers, stream buffers, and land on slopes greater than 72 percent with unstable soils. After these exclusions, the remaining lands are considered suitable and available for timber harvest.

The following land use designations within the Licking Creek project area are potentially suitable for timber harvest: Timber Production (11,389 acres) and Modified Landscape (2,779 acres). Of these lands, 5,530 acres (39 percent) were classified as unsuitable or unavailable for timber management, either through application of Standards and Guidelines (riparian areas and beach fringe), or soils and slope criteria.

Table 3-31  
Forest Land Classification Acres

Project Area NFS Land <sup>1</sup>	Non-forested Land	Non-commercial Forested Land	Commercial Forested Land	Suitable and Available Forest Land <sup>2</sup>
14,321	1,381	3,511	9,429	3,899

<sup>1</sup>Does not include water bodies or other ownerships (non-National Forest System land) within the project area.

<sup>2</sup>Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as unavailable for harvest, and were not included in this value.

Source: GIS, Tongass NF

The Logging System Transportation Analysis completed for the Licking Creek project area identified approximately 1,278 acres of potential harvest units. However, the GIS database is not refined enough to show small inclusions of unsuitable land within suitable stands. During unit layout, additional acres may be identified as being unsuitable for timber harvest. These are areas not capable of producing sufficient volume or not harvestable using existing technology,



and unmapped streams requiring additional riparian buffers. A list of the units that were excluded from consideration for harvest, with the rationale for excluding them, is in the project planning record.

Historically, forested lands in the Tongass National Forest were classified by volume class. The Forest Plan adopted a volume strata classification system, which replaced the volume classes, during the revision of the Forest Plan. Volume strata include hydric soils and slope information, as measures of productivity and growth rate. The following strata were defined by combining volume class data with hydric soil classification:

High Volume Strata - Areas within timber inventory volume classes 5, 6, and 7 on non-hydric soils, and on hydric soils with slopes greater than 55 percent.

Medium Volume Strata - Areas within timber inventory volume classes 5, 6, and 7 on hydric soils with slopes less than or equal to 55 percent; areas within timber inventory volume class 4 that are either on non-hydric soils, or are on hydric soils greater than 55 percent.

Low Volume Strata - Areas within timber inventory volume class 4 that are on hydric soils with slopes less than or equal to 55 percent.

Table 3-32 displays number of suitable acres within each strata for the Licking Creek project area.

Table 3-32  
Suitable and Available Acres<sup>1</sup> by Strata

Strata	Suitable and Available Acres	Percent of Suitable and Available Acres
Low	417	11%
Medium	594	15%
High	2,888	74%

<sup>1</sup> Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as unavailable for harvest, and were not included in this value.

Source: Stand exam and cruise data for the Licking Creek project area, 2000-2002.

## Past Harvest

Past harvest in VCU 7460 was initiated in the middle to late 1950s, and was concentrated along the beach on either side of Carroll Inlet. To date, 4,576 acres have been harvested within the VCU, of which 2,954 acres have been harvested within the Licking Creek project area boundaries. (For existing conditions, see the map for Alternative 1 - No Action in Chapter 2.)

All 2,954 acres were clearcut harvested and are being managed as even-aged stands. The first harvest in the project area first began in 1954. Between 1954 and 1962, harvest occurred in single units, generally along the beach fringe, employing an A-frame logging method. A total of 284 acres were harvested during this time. Significant harvest began in this area in the early 1970s. Between the years of 1972 and 1974, 1,330 acres were harvested (103 of those acres were harvested on private land). Subsequent entries were made in 1980 (47 acres), 1987-1990 (756 acres), 1993-1994 (480 acres) and 1996 (57 acres).

Most harvested stands regenerate naturally with the species that existed on the site before harvest. In stands where desirable species (Alaska yellow cedar, western red cedar or Sitka spruce) may not regenerate to their original levels, the harvest units may be planted to ensure their establishment.

All stands within the project area have successfully regenerated. In eight of the harvested units, 120 acres were planted. These plantings were prescribed as a way to manipulate species

## Volume Classification

# 3 Environment and Effects

composition and were not necessary to certify the stands as reforested as required by the National Forest Management Act (NFMA).

Precommercial thinning opens up stands with closed canopies to more light, allowing understory vegetation to persist longer. It can speed up stand development to reach later seral stages sooner, diversify the stand structure, and encourage a desired species mix in the regenerated stand. Diameter growth is faster, yielding stands with merchantable timber in less time than if left alone. Precommercial thinning can change the structure in young stands to meet a number of objectives for wildlife habitat, riparian function, and timber production.

In the project area, 725 acres have been precommercially thinned. In 85 of the thinned acres, canopy gaps were created to benefit wildlife. The remaining second growth in the project area was harvested either in the mid-1970s and is too old for optimum thinning, or was harvested in the early 1990s and will not be ready for thinning for another 2-5 years. Many of these older stands are in the beach buffer or in areas now designated as old growth and may no longer be managed for timber production. These stands, however, may be considered for thinning to improve wildlife old-growth habitat, and will be evaluated during monitoring.

## Environmental Consequences

### Timber Harvest

Proposed timber harvest for the Licking Creek project occurs on that portion of National Forest System land that is suitable and available for timber harvest. Suitable and available timberlands are forested lands that exclude:

- slopes greater than 72 percent (excluded unless the District Ranger approves harvest on slopes of 72 percent or greater on a case-by-case basis, based on the results of an on-site analysis of slope and Class IV channel stability, and an assessment of potential impacts of accelerated erosion on downslope and downstream habitat, other beneficial uses of water, and other resources),
- riparian habitat buffers,
- LUDs inappropriate for timber production, i.e., Old-growth Reserves,
- beach buffers,
- eagle buffers, and
- second growth which would not be available until the next rotation.

No timber harvest is proposed under Alternative 1 (No Action). Under the action alternatives, the acres that would be converted from mature forest to a managed condition range from 253 acres under Alternative 2 to 790 acres under Alternative 4 (Table 3-33). All proposed harvest units are within the Modified Landscape and Timber Production LUDs.

Table 3-33

Effects of the Action Alternatives on the Suitable and Available Timber Base<sup>1</sup> in the Licking Creek Project Area

	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Suitable and Available Timber<sup>1</sup></b>					
Acres	3,899	3,899	3,899	3,899	3,899
Volume CCF	212,865	212,865	212,865	212,865	212,865
(MMBF)	(106)	(106)	(106)	(106)	(106)
<b>Proposed Harvest</b>					
Acres	253	573	790	765	214
Percent of Suitable and Available by Acres	6.5%	14.7%	20.3%	19.6%	5.5%
<b>Proposed Volume</b>					
Volume CCF	10,709	23,832	33,556	32,261	11,118
(MMBF)	(5.4)	(11.9)	(16.8)	(16.1)	(5.6)
Percent of Suitable and Available by Volume	5.0%	11.2%	15.8%	15.2%	5.2%

<sup>1</sup> Acres scheduled to be sold in the Madder and Mop Pt./91 Knot timber sales were considered as unavailable for harvest, and were not included in this value.

Source: D. Fletcher 2002, S. McCoy 2003

### Proposed Harvest by Volume Strata

The proposed harvest of suitable and available acres within each volume strata, in the Licking Creek project area, is displayed in Table 3-34. The proposed harvest of low strata acres is 0.4 percent for all action alternatives except for Alternative 6, which would harvest no acres of low strata. The proposed harvest of medium and high strata acres varies by alternative from 6 percent to 22 percent.

Table 3-34

Proposed Harvest of Suitable and Available Acres by Strata

Strata	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Non-forested Inclusions	30	48	96	72	11
Low	2	2	2	2	0
Medium	35	69	130	90	25
High	186	454	562	601	178

Source: J. Llanos, GIS, 2002, 2003

### Volume Class and Coarse Canopy Stands

There is much interest as to the extent and location of coarse canopy stands, particularly when analyzing wildlife habitat. We are currently verifying the accuracy of Caouette's model for use in identifying those stands. Until that assessment is complete, general consensus from interagency biologists recognize that timber volume classes 6 and 7 are an adequate predictor of coarse canopy stands. Characteristics of these stands include relatively low stem densities, large diameters, and a coarse-textured canopy when viewed from the air. There are currently 367 acres of volume class 6, of which 232 are suitable available acres and 0 acres of volume class 7 within the project area (Table 3-35). We do not have information on the distribution of volume classes prior to timber harvest in the project area (pre-1954). Refer to the Biodiversity and Old Growth section in this chapter for additional discussion.

# 3 Environment and Effects

Table 3-35  
Volume Class by Acre for the Licking Creek Project Area

Volume Class (acres harvested <sup>1/</sup>	Available						
	Project Area Acres <sup>2</sup>	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Vol. Class 4	290	0	5	17	42	39	16
Vol. Class 5	3,025	0	184	404	558	569	188
Vol. Class 6	232	0	34	104	94	85	1
Vol. Class 7	0	0	0	0	0	0	0
Other (no volume class)	7,853	0	30	48	96	72	9
<b>Total</b>	<b>11,400</b>	<b>0</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>214</b>

<sup>1</sup>Volume Class displayed for information purposes only; volume classes 6 and 7 currently used as the best indicator of coarse canopy stands (see Biodiversity and Old Growth section of Chapter 3).

<sup>2</sup>Available acres in this analysis includes units to be sold in the Madder and Mop Pt./91 Knot timber sales.  
Source: J. Llanos, GIS, 2002, 2003

The percentage of volume proposed for harvest, by species, according to stand exam data, averages approximately 13 percent spruce, 72 percent hemlock, 8 percent Alaska yellow cedar and 7 percent Western red cedar for all harvest units within the project area.

Alaska yellow cedar, which is naturally sparsely distributed, is in decline across the Tongass. Stand exam surveys were taken but were concentrated in the overall proposed unit pool. Stand exams are used to obtain general volume figures for comparison across alternatives, potential insect and disease problems, and indications for potential sensitive resource areas. Yellow cedar decline is noted during stand exams as to whether it is present and its relative severity. This qualitative data indicates that, although there is yellow cedar decline present within the Licking Creek unit pool, much of it is minor in severity and/or located in only one area within a unit. In the entire examined unit pool, only Units 2, 30, 51, and 70 were identified as having yellow cedar decline in severities rated as severe. In areas of Alaska yellow cedar decline it is important that the timber be salvaged before the value is lost. In these units, as in all units, the regeneration would be closely monitored following harvest. If it appears that Alaska yellow cedar is not being adequately restocked, then these units may have planting prescribed at that time.

There has been concern that disproportionate amounts of Alaska yellow cedar and Western red cedar are being harvested on the Tongass. The stand exam data collected in the project area during the field seasons of 2000 and 2001 shows that within the entire Licking Creek unit pool, the percentages of Alaska yellow cedar and Western red cedar, in net cubic foot volume, are 8 percent and 7 percent, respectively. This is slightly less than the estimate calculated from the most recent Forest-wide inventory completed between 1995 and 2000 by the Pacific Northwest Research Station, Forest Inventory and Analysis (FIA) unit. In the Forest Service Region 10 report, "Cedar Harvest on the Tongass National Forest (1997-2001)," from March 18, 2002, the estimated net cubic volume, calculated from the FIA data, for the Ketchikan area is 9.5 percent Alaska yellow cedar and 12.5 percent Western red cedar. The percent of Alaska yellow cedar proposed for harvest in the Licking Creek project, in net cubic volume by alternative, is: Alternative 2, 14 percent; Alternative 3, 11 percent; Alternative 4, 4 percent; Alternative 5, 8 percent; and Alternative 6, 2 percent. The percent of Western red cedar is: Alternative 2, 7 percent; Alternative 3, 4 percent; Alternative 4, 9 percent; Alternative 5, 4 percent; and Alternative 6, 4 percent.

## Silvicultural Systems

The term "silvicultural system" refers to a planned process whereby a stand is harvested, re-established and tended to achieve a desired condition. The system name is based on the number of age classes present after the initial harvest, such as even-aged, two-aged and uneven-aged systems. (For a detailed discussion of silvicultural systems and methods, see the Forest Plan Final EIS, Appendix G. Criteria for the selection of harvest methods and silvicultural



systems are also presented in the National Forest Management Act implementing regulations (36 CFR 219.27)).

*Even-aged systems* produce stands that consist of trees of the same or nearly the same age. A stand is considered even-aged if the range in tree ages normally does not exceed 20 percent of the age at which the stand is to be harvested (the "rotation age"). Seed tree cutting, shelterwood cutting, and clearcutting produce even-aged stands.

*Uneven-aged systems* create stands that include three or more distinctly different age classes. Uneven-aged conditions are created through management by using individual tree or group selection methods.

*Two-aged systems* utilize treatments that leave behind a substantial portion of the original stand structure, in the form of large trees distributed or clumped throughout the stand area. The remnant trees left on the site represent one "age class" and the newly established trees represent another age class. No two-aged system treatment is prescribed for this project and this system will not be discussed further.

Even-aged systems more closely mimic the natural conditions of the large-scale disturbance ecologies (for instance, areas subject to windthrow and landslides), while uneven-aged systems more closely mimic gap-dominated old-growth ecosystems (where large-scale disturbance is not a major factor). Both disturbance types are prevalent throughout Southeast Alaska.

The selection of the appropriate silvicultural system is dependent upon the feasibility of achieving sound silvicultural objectives. These can include objectives for species composition, stand density, growth rates, insect and disease control, and overstory development. The Forest Plan and issues raised by the public and resource managers are used to refine site-specific objectives. It is important to distinguish scale when visualizing harvest treatments for individual units or stands. For instance, while the ideal condition may be to apply a treatment uniformly over an entire harvest unit, this is often not possible due to terrain, logging systems capabilities, and vegetative conditions.

The action alternatives contain mostly even-aged silvicultural systems with a small portion of uneven-aged systems (Table 3-36). The proposed harvest units range from 7 acres to 93 acres in size. The site-specific silvicultural prescriptions are listed in the unit cards (Appendix B of the Draft EIS).

**Table 3-36**  
Prescribed Silvicultural System by Alternative in Percent of Acres

Silvicultural System	Alt. 1 (% acres)	Alt. 2 (% acres)	Alt. 3 (% acres)	Alt. 4 (% acres)	Alt. 5 (% acres)	Alt. 6 (% acres)
Even-aged	0%	100%	96%	99%	96%	100%
Uneven-aged	0%	0%	4%	1%	4%	0%
<b>Total Acres:</b>	<b>0</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>214</b>

Source: Sheila Spores, 2002, 2003

A random sample of harvest units on the Tongass in 2001 showed that 29 percent were even-aged, 33 percent two-aged, and 38 percent uneven-aged, which is below the Forest Plan forecast of even aged harvest forest-wide (unpublished report, Zaborske et. al. 2002).

## Silvicultural Prescriptions

Prescriptions are documented descriptions of activities needed to implement the silvicultural treatment, or treatment sequence to move a stand towards a desired silvicultural system. The following harvest treatments are examples of some prescriptions selected for use in the Licking Creek project area.

### 3 Environment and Effects

Should one of the action alternatives be selected, these prescriptions would be applied to specified units to achieve the following desired stand conditions in the Licking Creek project area. All prescriptions are designed to meet all standards and guidelines that are applicable to a particular unit.

#### **Even-aged Prescriptions**

**Even-aged clearcut with reserves (EACCR):** Most merchantable trees would be harvested. The objective is to create a fast-growing stand of trees to maximize wood fiber production. Some trees would be left standing, either clumped or singly, to create future stand diversity and to provide some structure in the stand. The stand would regenerate into a mostly single-aged stand. Where this treatment is recommended, it has been determined that it is optimal for the site and the created openings would not exceed 100 acres, to be in compliance with the National Forest Management Act.

The above prescription can be applied in areas of high-value marten habitat to meet Marten Standards and Guidelines. At least 10-20 percent of the stand structure is placed into reserve. Stand exam data is used to calculate whether there are enough large trees (4 per acre greater than 20" dbh) and snags (3 per acre greater than 20" dbh) in the reserve areas. If not, a larger amount of acreage is left in reserve in order to ensure that the Marten Standards and Guidelines are being met.

#### **Uneven-aged Prescriptions**

Uneven-aged management techniques include removing individual trees, groups of trees, and a fixed percentage of basal area in a stand. Stands proposed for an uneven-aged system in this project would have approximately 50 percent of the basal area removed this entry. The remaining 50 percent of the basal area would be removed over two more entries, each of these entries removing approximately 25 percent of the basal area, for a total of three entries. The resulting stands would mimic many of the characteristics of stands that develop in areas where small-scale blowdown predominates. Rotation lengths are likely to be about 150 years under these systems, and there would be some reduction in fiber production as compared to even-aged systems (like clearcuts), which commonly have rotation lengths of about 100 years in the Licking Creek project area.

The treated stands would have a high level of structural diversity, as enough of the overstory would be removed to allow younger trees to grow and seedlings to become established. Shade-tolerant species, such as western hemlock and cedar, would be favored, although spruce would grow in the larger openings.

**Group Selection (GS):** Trees would be removed in small patches and/or strips, with the widths of the openings generally not exceeding approximately twice the height of mature trees in the stand. Trees infected with dwarf mistletoe would be targeted for removal to avoid infection for the regeneration. Groups with windfirm characteristics would be a high priority to leave. Each harvested opening would regenerate, creating a patch of trees with a uniform age and height. These openings may be thinned. This would maintain or create a stand of three or more distinct size classes in small groups, resulting in an uneven-aged stand. The appearance of the residual stand mimics natural blowdown patches.

**Single Tree Selection (STS):** Trees would be removed singly and dispersed evenly throughout the stand. Trees would be selected for removal using a criterion such as species, diameter limits, or spacing. A range of diameters, or everything above or below a certain diameter limit, may define the trees selected for harvest. The resulting stand may have small openings plus individual trees harvested throughout the stand. Removing trees throughout the stand would retain a continuous large tree canopy following harvest and still manage the stand for timber production. This would maintain or create three or more distinct size classes distributed throughout the stand. The residual stand would have structural diversity that would provide wildlife habitat and maintain scenic quality. Marten Standards and Guidelines would be met in high-value marten habitat.

## Logging Systems

Yarding is the process of transporting logs from the stump to the landing. This can be done using ground-based equipment, cable logging systems, or helicopters. The method prescribed depends upon many factors, including access, topography, slope, and resource protection needs.

All proposed logging systems are in conformance with national and regional standards and guidelines. Logging systems were assigned to the harvest units through interdisciplinary analysis to minimize potential effects; special logging requirements are specified on the unit cards (Appendix B of the Draft EIS). We inspect the harvest units during the planning and layout process to ensure that the management objectives for resource protection are met.

Economics is also an important factor in choosing the yarding method. The most economical logging systems currently in use are cable and shovel yarding. The most expensive is helicopter logging.

### Ground-based Yarding

Moist, soft soil conditions in conjunction with steep slopes found in the project area limit the use of ground-based equipment operation. Approximately 3 to 13 percent of the proposed harvest acres could be shovel yarded with track-mounted log loaders, depending on alternative (Table 3-37). Road rights-of-way are particularly suitable for shovel yarding. Shovel yarding is generally the most economical yarding method, although its use is limited in Southeast Alaska due to prohibitive field conditions, including its potential for ground disturbance.

### Cable Yarding

Cable yarding systems are the most common logging systems used throughout Southeast Alaska. Cable systems have the capability to partially or fully suspend logs over the ground, reducing soil disturbance. These systems are best suited to even-aged silvicultural prescriptions. When trees are retained to meet other resource concerns, the economic efficiency declines. Table 3-37 displays the amount of cable system by alternative.

### Helicopter Yarding

With this system, logs are lifted off the ground (fully suspended) and flown to a landing or barge. This yarding system causes the least amount of ground disturbance of all the systems, and usually has the highest yarding cost, as much as three times higher than cable-logging systems. Consequently, the economic feasibility of helicopter logging is more closely affected by timber market values than the other types. Helicopter logging was considered in all but one of the action alternatives (Table 3-37). Helicopter yarding is used where roadbuilding is either infeasible or not desired for other reasons, such as to mitigate soils concerns.

### 3 Environment and Effects

Table 3-37  
Proposed Logging Systems for the Licking Creek Timber Sale

Logging System	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Cable</b>					
Acres <sup>1</sup>	102	235	425	155	189
Volume CCF (MMBF)	5,293 (2.6)	12,537 (6.3)	22,964 (11.4)	8,421 (4.2)	10,895 (5.4)
<b>Shovel</b>					
Acres <sup>1</sup>	7	14	84	12	15
Volume CCF (MMBF)	303 (0.2)	711 (0.4)	4,392 (2.2)	642 (0.3)	223 (0.2)
<b>Helicopter</b>					
Acres <sup>1</sup>	94	194	114	430	0
Volume CCF (MMBF)	5,113 (2.6)	10,584 (5.3)	6,200 (3.1)	23,198 (11.6)	0

<sup>1</sup>Acres reflect unit acres reduced for marten habitat, soils, stream buffers and visual deferrals, therefore total acres actually logged by alternative will be less than unit acres by alternative shown elsewhere in the document.  
Source: D. Fletcher 2002, S. McCoy 2003

#### Post-harvest Effects

We expect that all harvested areas would naturally regenerate and be certified as fully stocked after three full growing seasons. Approximately 38,270 acres have been harvested on the Ketchikan-Misty Fiords Ranger District between 1954-2001. Monitoring of previous harvest units on this District shows a 100 percent regeneration success rate. Regeneration (stocking) surveys would be conducted on all harvest units after the third full growing season following the completion of logging.

After reforestation, managed forests grow through several successional stages, in which different components dominate the stand and forest structure changes over time. All harvest alternatives would move the project area toward the Forest Plan desired condition of a balanced mix of stand structures and ages across the landscape.

Precommercial thinning would be performed on areas managed using even-aged silvicultural systems approximately 15-20 years after harvest, based on site, stocking, and other resource needs. This treatment reduces competition for sunlight, moisture, and nutrients, allowing the understory plants and remaining conifers to grow at accelerated rates for a longer time than in unthinned stands. It can also be used to change species composition and windfirmness of the stand. Some acres would not be thinned due to steep terrain, inaccessibility, and safety considerations.

#### Long-term Timber Productivity (Yield)

All stands proposed for harvest are mature, uneven-aged, and beyond the age of maximum average annual growth of the stand. Harvest increases forest floor temperatures, which speeds up organic decomposition and increases the supply of available nutrients to the trees. The effects of all action alternatives on long-term yield would be the conversion of unmanaged, slow-growing, mature stands to managed, faster-growing, multi-aged or even-aged stands.

The open conditions created by even-aged harvest systems allow Sitka spruce, western red cedar, Alaska yellow cedar and western hemlock to regenerate rapidly. The spruce and cedar components can be increased by selectively thinning the hemlock, in an attempt to maintain the original species composition. The composition of the uneven-aged stands proposed in the



## Direct and Indirect Effects

Licking Creek project area is expected to be similar overall to the original composition. Over the course of several cutting cycles, however, the mix may vary.

Timber harvest would affect the structure of the forest. Clearcut harvest management would create primarily second-growth stands with or without older residual trees. Uneven-aged harvest would create stands with a variable stand and age structure, depending on the site-specific prescriptions. Forest health concerns, including the removal of trees with disease or that face imminent mortality, could be used as factors in determining which trees to harvest.

### Alternative 1

Vegetation and forest health would not be affected. Tree growth and mortality would continue to progress at the same rate as present. Forest lands located elsewhere would need to be harvested to meet market demands for timber.

In this alternative, 25 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

### Alternative 2

This alternative harvests the fewest acres of the action alternatives. Two-hundred fifty-three acres would be converted to managed stands, all of which would be managed as even aged. Thirty-four acres would be clearcut harvested with only unmerchantable trees left remaining where operationally feasible. Seven acres would have a seed tree harvest applied, where approximately 5 percent of the basal area would be retained in desirable crop trees to provide a seed source to aid in regeneration of certain species. In the remaining 212 acres of even-aged stands, reserve trees would be left, either scattered and/or clumped throughout the unit, in areas of high-value marten habitat to retain some of the old-growth characteristics of the forest.

Forty-six percent of harvested acres would be helicopter yarded, 50 percent cable yarded, and 4 percent shovel yarded. Alaska yellow cedar comprises 14 percent of the volume in net cubic feet.

Forest health and productivity would be improved by the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests.

In this alternative, 27 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

### Alternative 3

This alternative would convert 573 acres of old-growth forest to a managed condition. Of these acres, 96 percent would be managed as even-aged forest. Thirty-four acres would be clearcut harvested with only unmerchantable trees left remaining where operationally feasible. Seven acres would have a seed tree harvest applied, where approximately 5 percent of the basal area would be retained in desirable crop trees to provide a seed source to aid in regeneration of certain species. In the remaining 510 acres of even-aged stands, reserve trees would be left, either scattered and/or clumped throughout the unit, in areas of high-value marten habitat to retain some of the old-growth characteristics of the forest. Twenty-two acres would be managed as uneven-aged forest. Trees would be removed, either singly throughout the entire unit or removed in small patches and/or strips, to retain approximately 50 percent of the trees. This would create a mosaic of old-growth forest with regeneration in the openings.

Forty-four percent of harvested acres would be helicopter yarded, 53 percent cable yarded, and 3 percent shovel yarded. Alaska yellow cedar comprises 11 percent of the volume in net cubic feet.

Forest health and productivity would be improved by the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests.

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In this alternative, 28 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

## Alternative 4

This alternative would have the greatest effect on vegetation in the Licking Creek project area. About 790 acres would be converted to managed stands. Of these acres, 99 percent would be managed as even-aged forest. Fifty-three acres would be clearcut harvested with only unmerchantable trees left remaining where operationally feasible. In the remaining 731 acres of even-aged stands, reserve trees would be left, either scattered and/or clumped throughout the unit, in areas of high-value marten habitat to retain some of the old-growth characteristics of the forest. Six acres would be managed as uneven-aged forests. Trees would be removed, either singly throughout the entire unit or removed in small patches and/or strips, to retain approximately 50 percent of the trees. This would create a mosaic of old-growth forest with regeneration in the openings.

Eighteen percent of harvested acres would be helicopter yarded, 68 percent cable yarded, and 14 percent shovel yarded. Alaska yellow cedar comprises 4 percent of the volume in net cubic feet.

Forest health and productivity would be improved by the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests.

In this alternative, 29 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

## Alternative 5

This alternative would convert 765 acres of old-growth forest to a managed condition. Of these acres, 96 percent would be managed as even-aged forest. Sixty-two acres would be clearcut harvested with only unmerchantable trees left remaining where operationally feasible. In the remaining 675 acres of even-aged stands, reserve trees would be left, either scattered and/or clumped throughout the unit, in areas of high-value marten habitat to retain some of the old-growth characteristics of the forest. Twenty-eight acres would be managed as uneven-aged forest. Trees would be removed, either singly throughout the entire unit or removed in small patches and/or strips, to retain approximately 50 percent of the trees. This would create a mosaic of old-growth forest with regeneration in the openings.

Seventy-two percent of harvested acres would be helicopter yarded, 26 percent cable yarded, and 2 percent shovel yarded. Alaska yellow cedar comprises 8 percent of the volume in net cubic feet.

Forest health and productivity would be improved by the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests.

In this alternative, 29 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

Access to units in this alternative would be greatly limited due to no road construction. This would lead to a greater expense in reforestation work and would possibly limit or prohibit pre-commercial thinning opportunities in the future.

## Alternative 6

This alternative would convert 214 acres of old-growth forest to a managed condition. Of these acres, 100 percent would be managed as even-aged forest. In all of these even-aged stands, reserve trees would be left, either scattered and/or clumped throughout the unit, in areas of high-value marten habitat to retain some of the old-growth characteristics of the forest.

Ninety-three percent of harvested acres would be cable yarded and 7 percent shovel yarded. Alaska yellow cedar comprises 2 percent of the volume in net cubic feet.

Forest health and productivity would be improved by the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests.

In this alternative, 26 percent of the original productive acres of old growth in VCU 7460 would be second-growth forest. This includes the 103 acres of privately harvested land that was harvested in 1974.

Access to units in this alternative would be greatly limited due to no road construction. This would lead to a greater expense in reforestation work and would possibly limit or prohibit pre-commercial thinning opportunities in the future.

## Cumulative Effects

Long-term sustainability is the ability of an area to provide a supply of wood fiber over the long term. Timber harvest in the Licking Creek Timber Sale would have a direct positive effect on the project area's long-term sustainability. Most of the existing timber stands on the Tongass National Forest are beyond culmination of mean annual increment (CMAI), or optimal growth rate. On second-growth stands typical in Southeast Alaska, the age of merchantable CMAI is around 100 years with a mean annual increment of 137 cubic feet/acre/year. This growth rate is significantly higher than in existing old-growth stands. As a greater proportion of the forest is converted from slower growing stands to younger stands, total forest growth increases. Managed young-growth would be able to provide significantly higher harvests on the same land base or support the same harvest on a smaller land base. (Refer to the Forest Plan EIS, page 3-299 for additional discussion.) Under the 1997 Forest Plan, the rotation for even-aged management in the project area is approximately 100 years, but varies with site-specific conditions.

Past harvesting has resulted in the conversion of 2,954 acres from old-growth forest to second-growth forest within the project area. Although some of these acres are no longer in the timber base due to changes in Standards and Guidelines (i.e. 1,000' beach buffer), much of the second growth is on forested land within the suitable timber base. The Forest Plan has designated management of this suitable timber for the reasonably foreseeable future. Forest-wide, existing second growth has been scheduled as part of the timber supply. Thinning of second growth or conversion to uneven-aged management may occur. The two proposed harvest units that have an uneven-aged management prescription have subsequent entries planned.

Table 3-38 displays the cumulative effects of timber harvest on the suitable timber base in the project area for the reasonably foreseeable future. Approximately 258 acres are scheduled to be sold and harvested in the project area, as part of the Madder and Mop Point/91 Knot Timber Sales. Alternative 1 for the Licking Creek Timber Sale would not contribute to the harvest of the suitable timber base. Stands selected for harvest in Alternatives 2 through 4 for the Licking Creek Timber Sale would be managed on a 100-year rotation.

Future harvest entries scheduled in the project area would depend heavily on the volume remaining within the suitable and available timber base, which would range from 202,156 CCF (101.1 MMBF) after implementation of Alternative 2 to 179,309 CCF (89.7 MMBF) after Alternative 4 (Table 3-38).

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Table 3-38  
Cumulative Effects to the Suitable and Available Timber Base in the Project Area

Timber Sale Project	Suitable and Available Acres Pre-Harvest	Suitable Timber Base Harvested (acres)	Change to Suitable Timber Base (percent)	Suitable and Available Acres Post-Harvest
Madder and Mop Point/91 Knot Timber Sales <sup>1</sup>	4,157	258	6.2%	3,899
Licking Creek Alt. 2 + above sales	4,157	511 (253 plus 258)	12.3%	3,646
Licking Creek Alt. 3 + above sales	4,157	831 (573 plus 258)	20.0%	3,326
Licking Creek Alt. 4 + above sales	4,157	1,048 (790 plus 258)	25.2%	3,109
Licking Creek Alt. 5 + above sales	4,157	1,023 (765 plus 258)	24.6%	3,134
Licking Creek Alt. 6 + above sales	4,157	472 (214 plus 258)	11.4%	3,685

<sup>1</sup>The Madder and Mop Pt./91 Knot timber sales have signed decisions and are scheduled to be sold.  
Source: D. Fletcher 2002, S. McCoy 2003



## Soils

This section reviews the existing information on the Licking Creek project area for management of soils, including mass wasting, erosion, and soil productivity. Information from the Forest Service's GIS database, and field surveys of the project area were used. A Forest-wide treatment of soils may be found in the Forest Plan Final EIS, Chapter 3, and the Forest Plan, Chapter 4 and Appendix C. The unit and road cards (Appendix B of the Draft EIS) contain additional site-specific mitigation for implementation.

## Affected Environment

Soil development in Southeast Alaska is influenced by high levels of rainfall, cool maritime temperatures, and moderately low annual soil temperatures. Under these conditions, organic material decomposes slowly, resulting in thick surface layers of organic soil. Windthrow, flooding, and landslides are important types of natural disturbance that alter the soil properties. In general, parent material, topography, vegetation, animals, and climate influence soil features that affect and are affected by timber harvest activities. Soils influence vegetation composition, water quality, riparian areas, and wetland values, and the productivity of timber and fish, and indirectly affect wildlife in the Licking Creek project area.

### Soil Loss

#### Mass Movement Erosion

Mass wasting events, also called landslides, are the naturally occurring dominant process of erosion in Southeast Alaska. Landslides can deliver soil, rock, and debris to the aquatic environment. They are most likely to occur on steep valley sideslopes and within V-notches (Swanston, 1969; Swanston, 1991). V-notches (steep, deeply incised streams) are located throughout the project area.

Landslides may occur during or immediately after periods of heavy rainfall, when soils are saturated (Swanston, 1970). Slides usually occur on steep slopes that have soils with distinct subsurface layers such as compact glacial till or bedrock that slopes parallel to the ground surface. These parallel subsurface layers form a smooth slip-plane on which slides occur (Flaccus, 1959, cited in Bishop and Stevens, 1964).

An inventory of landslides in the Licking Creek project area was completed in 2002. This inventory used aerial photos and on-site reconnaissance to identify landslides. Twelve slides were found in managed areas in a photo of the project area, which is about 1 slide for every 318 acres harvested. This does not take into account what year the areas were harvested, percent slopes the landslides occurred on, what type of yarding was used (i.e. helicopter, cable, or shovel), or soil types involved. These slides were generally much smaller than slides that have occurred in old growth, which is in agreement with findings of landslide research in the region (Swanston, 1991).

The Forest Service uses a Mass Movement Index (MMI) to identify potentially unstable sites in a project area. The MMI summarizes the physical properties of a soil, and rates the relative stability of the soil into one of four classes of landslide potential: 1 (low), 2 (medium), 3 (high), and 4 (very high). Most mineral soils that occur on slopes greater than 72 percent gradient, and some mineral soils with restricted drainage on slopes greater than 60 percent gradient, are classified as MMI 4.

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Table 3-39  
Mass Movement Index Classes and Slopes Greater than 72 Percent in the Project Area by Watershed (Acres)<sup>1</sup>

	Acres of Slopes Greater than 72% <sup>2</sup>	Acres of MMI 1	Acres of MMI 2	Acres of MMI 3 <sup>2</sup>	Acres of MMI 4 <sup>2</sup>
Project Area Acres	2,294	3,071	4,788	7,031	2,995

<sup>1</sup>Some of the acres listed here are outside of the project area, as some of the watershed boundaries extend beyond the project area. (Refer to Figure 3-4, Watershed map, under Water Quality and Fish Habitat.)

<sup>2</sup>Some acres of Slopes greater than 72% are also counted in the acres of MMI 3 and MMI 4 soils.

Source: J. Llanos, GIS, 2001

At the Forest Plan level, slope gradients of 72 percent or more are removed from the tentatively suitable timber base due to high risk of soil mass movement and accelerated erosion of Class IV channel systems. At the project planning level (e.g. Licking Creek Timber Sale), the Forest Supervisor or District Ranger may approve timber harvest on slopes of 72 percent or more on a case-by-case basis, based on the results of an on-site analysis of slope and Class IV channel stability and an assessment of potential impacts of accelerated erosion on downslope and downstream fish habitat, other beneficial uses of water, and other resources (Forest Plan, page 4-84).

Proposed harvest units with some indicator of soil instability were field reviewed by a soil scientist. In some instances, the soil scientist identified slopes greater than 72 percent that are suitable for timber harvest due to lower-than-MMi 4 landslide potential. In most harvest units, these are short pitches adjacent to cliffs or rock outcrops, and do not present a high risk for mass movement. Detailed on-site soil stability investigation reports are included in the Licking Creek Soils, Wetlands, and Floodplains Resource Report in the project planning record.

Landslides may also occur in association with roads. Currently, there are 38.2 miles of existing road in the project area. Sixteen slides (27.1 percent of all landslides found in the project area) were attributed to roads, approximately 1 slide for every 2.4 miles of road constructed. It is important to note, however, that all of these slides occurred due to road construction on steep slopes. The slopes measured in the field were from 70-90 percent. Forest Plan guidance is to avoid locating a road on a slope greater than 67 percent, on an unstable slope, or in a slide-prone area, where feasible (Forest Plan, page 4-84).

#### Surface Erosion

Management can cause surface erosion, a process not typically found in the natural environment in Southeast Alaska since thick organic surface layers and vegetation roots help protect mineral soil from erosion. When the organic surface layer is removed, however, the mineral soils are exposed, and erosion can occur. The rate of erosion depends primarily on the amount and type of vegetation, erodibility of the soil, and the steepness of slope.

Management activities can increase surface erosion through disturbance of the protective organic mat. Surface organic layers can be removed by yarding activities, exposing underlying mineral soils to overland flow. Road cuts can intercept the shallow subsurface flow along a hillside and concentrate runoff into ditch lines, which can then erode the road surface and deliver sediment to streams at crossings. This process can also increase the effective drainage network as road ditches intercept runoff and form new channels.

In the project area, existing roads needing repair are a potential source of surface erosion. Sediment-plugged culverts become sediment sources when stream flow is strong enough to remove the culvert and associated sediment. Cutbank erosion and slumping are also potential sediment sources. Sections of road needing reconstruction are listed in the road cards (Appendix B of the Draft EIS), and road conditions are discussed further under Transportation (Chapter 3).

## Environmental Consequences

### Direct and Indirect Effects

#### Effects on Soil Productivity

Soil productivity is defined as the capacity of the soil to produce plant growth, due to the soil's inherent chemical, physical, and biological properties.

Road construction and rock pit development remove forest soils from timber production. In addition, side casting of material and overshot rock results in a loss to soil productivity. To mitigate negative impacts caused by landing construction and location, BMP 13.10, Log Landing Location and Design, would be used to design and construct landings to minimize soil erosion and water quality degradation (FSH 2509.22).

Soil and water resource protection measures would be incorporated into the design of roads (BMP 14.3, FSH 2509.22). For all alternatives involving the construction of roads, the total loss of soil productivity equals the area covered by new roads (Table 3-40). We assumed 2.9 acres of disturbance per mile of road and 1 acre of disturbance for each proposed rock pit within the project area. About half of the needed rock pits already exist on the project area. We assumed ¼ acre of disturbance per pit for further development.

Table 3-40

Potential Soil Disturbance from Road and Rock Pit Construction in the Licking Creek Project Area

Proposed Activity	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Acres of disturbance from road construction <sup>1</sup>	0 acres	3.71 acres	5.37 acres	12.04 acres	0 acres	0 acres
Acres of disturbance from rock pit development <sup>2</sup>	0 acres	0.64 acre	1 acre	2 acres	0 acres	0 acres
<b>Total Disturbance</b>	<b>0 acres</b>	<b>4.35 acres</b>	<b>6.37 acres</b>	<b>14.04 acres</b>	<b>0 acres</b>	<b>0 acres</b>

<sup>1</sup> Assumes 2.9 acres of disturbance per mile of road constructed.

<sup>2</sup> Assumes 0.5 acres of disturbance per mile of road constructed.

Source: P. Frohne, 2002, 2003

Alternative 4 proposes the most road development of the alternatives; if implemented, Alternative 4 would result in the greatest loss of long-term soil productivity. Alternative 3 proposes less road development than Alternative 4, Alternative 2 proposes less development than Alternatives 3 and 4, and Alternatives 5 and 6 propose no new road development.

Soil displacement within harvest units can have detrimental impacts to soil productivity. Soil disturbances are areas where felling of trees or yarding of logs has impacted the surface organic mat. Small soil disturbances are not considered detrimental, but disturbances larger than 100 square feet are referred to as "soil displacements" and are considered detrimental to soil productivity (Region 10 Soil Quality Standards).

#### Effects on Surface Erosion

While surface erosion is not a pervasive problem in the project area, sediment can be delivered to streams at road crossings. Short-term effects are associated with road construction activity, and long-term effects are produced by the erosion of road surfaces and cut-and-fill slopes.

Sediment transport from road construction activities would be minimized with erosion control measures and BMPs. Long-term erosion of the road prism and associated cut-and-fill slopes would be addressed by post-construction BMPs, which include revegetation, road maintenance, and decommissioning of roads (pulling culverts and reseeding the road bed).



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Stream crossings increase the amount of sediment delivered to a stream over natural conditions. This effect would be minimized with BMPs such as Bridge and Culvert Design and Installation (BMP 14.17) and the Control of In-channel Operations (BMP 14.14) (FSH 2509.22). Crossing structures would be designed to pass extreme flow events that could plug culverts and result in failure of the crossings.

The number of stream crossings differs among the action alternatives. (See the Watershed and Fisheries section in this chapter.)

#### Effects on Mass Movement Erosion

Timber harvest can induce slumping in the sidewalls of V-notches through the removal of protective vegetation. This effect would be minimized by applying no-harvest buffers to (at a minimum) the topographic slope break above Class III streams and by using harvest systems that yard the timber away from streams.

Vegetation, particularly tree roots, has a stabilizing effect on slopes. Maximum loss of rooting strength occurs 3 to 5 years after a tree is cut, resulting in a reduction in soil shear strength (Swanston and Walkotten, 1969). This reduction of soil shear strength results in an increased likelihood of landslides on steep slopes following clearcutting. Effects of partial cutting on slope stability in Southeast Alaska are largely unknown. Under natural conditions, windthrow is an important triggering device of landslides in Southeast Alaska. Research in Southeast Alaska has suggested that, although less than 10 percent of all landslides in the past 20 years were related to logging or roads, these activities may increase the potential for landslides in a given area (Swanston, 1991).

Landslides are most likely to occur when timber is harvested or roads are constructed on landscapes with very high mass movement indices (MMI 4). Landslides are less likely on areas with a lower MMI rating (MMI 1-3), although all of the 12 slides found in managed areas in the project area were on MMI 2 and MMI 3 soils. A minor degree of site disturbance is unavoidable under any timber harvest activity. Table 3-41 displays the acres or miles of proposed project activities located in potential high-risk sites.

**Table 3-41**  
**Proposed Roads and Timber Harvest Activities in Sites at High Risk for Soil Erosion**

Proposed Activity	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Length of disturbance associated with roads on MMI 4 soils <sup>1</sup>	0	200 ft.	200 ft.	0	0	0
Acres of timber harvest on MMI 4 soils <sup>1</sup>	0	0	0	0	0	0
Acres of harvest on slopes exceeding 72 percent	0	9.0	34.5	36.5	37.8	14.9
Percent of harvest on slopes exceeding 72 percent	0	3.5%	6.0%	4.6%	4.9%	7.0%
<b>Total High-risk Acres in Project Area<sup>2</sup></b>	<b>0</b>	<b>9.1</b>	<b>34.6</b>	<b>36.5</b>	<b>37.8</b>	<b>14.9</b>

<sup>1</sup> Two road segments, totaling less than 200 feet in length, are proposed on slopes exceeding 67 percent. Best Management Practice 14.12, Control of Excavation and Sidecast Material, would be applied in these areas.

<sup>2</sup> Areas of MMI4 soils and slopes >72% unsuitable for timber harvest have been placed into permanent reserve from harvest. Acres shown here have been reviewed by the soils scientist and recommended for timber harvest. Source: P. Frohne, 2002, 2003

The soil scientist used photo interpretation and ground reconnaissance to evaluate potential effects of the action alternatives (Table 3-41). All alternatives would meet Forest Plan Standards and Guidelines and the Forest-wide strategy for soil protection. In most harvest units, the slopes exceeding 72 percent recommended for harvest are short pitches adjacent to



cliffs or rock outcrops, and do not present a high risk for mass movement. Soil protection measures and Best Management Practices (BMPs) would be applied to minimize surface erosion and mass wasting. (These are listed on the unit and road cards in Appendix B of the Draft EIS.) Detailed on-site soil stability investigation reports are included in the Licking Creek Soils, Wetlands, and Floodplains Resource Report in the project planning record.

Very little road construction is proposed on slopes exceeding 67 percent. Only two very short stretches of road that access Units 44 and 67 (both only in Alternative 4) are proposed on slopes exceeding 67 percent, and these total less than 200 feet in length. This length of construction, if landslide rates were similar to past landslide rates due to roads, would not result in a slide. Best Management Practice 14.12, Control of Excavation and Sidecast Material, would be applied to reduce the risk of mass movement in these small areas.

Based on the results of the landslide inventory of past harvest units (1 slide per 318 acres), we can predict the number of landslides for each action alternative. We predict 0.8 landslide for Alternative 2, 1.8 slides for Alternative 3, 2.5 slides for Alternative 4, 2.4 slides for Alternative 5, and 0.7 slide for Alternative 6. Alternative 4 has the largest harvest acreage planned, followed by Alternatives 5, 3, 2, and 6, so it follows that Alternative 4 has the highest predicted rate of landslides. No slides are predicted from new road construction.

## **Alternative 1**

No additional sediment sources or transport pathways would be created. However, existing sources would continue to produce minor amounts of sediment.

## **Alternative 2**

The direct and indirect effects of Alternative 2 pose the lowest risk to soil resources of the action alternatives. Proposed activities would occur on about 10 acres of high-risk sites (Table 3-41). While timber felling and yarding would result in ground disturbance, the use of BMPs and no-disturbance buffers would minimize sediment delivery from harvest units to the stream system. Timber harvest activities may cause one new landslide in the project area (0.8 slide is predicted). No slides are predicted from new road construction.

## **Alternative 3**

The direct and indirect effects of Alternative 3 pose the third-highest risk to soil resources. Proposed activities would occur on about 35 acres of high-risk sites (Table 3-41). While timber felling and yarding would result in ground disturbance, the use of BMPs and no-disturbance buffers would minimize sediment delivery from harvest units to the stream system. Timber harvest activities may cause one to two new landslides in the project area (1.8 slides are predicted). No slides are predicted from new road construction.

## **Alternative 4**

The direct and indirect effects of Alternative 4 pose the second-highest risk to soil resources. Proposed activities would occur on about 37 acres of high-risk sites (Table 3-41). While timber felling and yarding would result in ground disturbance, the use of BMPs and no-disturbance buffers would minimize sediment delivery from harvest units to the stream system. Timber harvest activities may cause two to three new landslides in the project area (2.5 slides are predicted).

No slides are predicted from new road construction. Only two very short stretches of road are proposed on slopes exceeding 67 percent, and these total less than 200 feet in length. Best Management Practice 14.12, Control of Excavation and Sidecast Material, would be applied to reduce the risk of mass movement in these small areas.

## **Alternative 5**

The direct and indirect effects of Alternative 5 pose the highest risk to soil resources. Proposed activities would occur on about 38 acres of high-risk sites (Table 3-41). While timber felling and yarding would result in ground disturbance, the use of BMPs and no-disturbance buffers would minimize sediment delivery from harvest units to the stream system. Timber harvest

## **Effects by Alternative**

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activities may cause two to three new landslides in the project area (2.4 slides are predicted). No new road construction is proposed in this alternative.

## Alternative 6

The direct and indirect effects of Alternative 6 pose the fourth-highest risk to soil resources. Proposed activities would occur on about 15 acres of high-risk sites (Table 3-41). While timber felling and yarding would result in ground disturbance, the use of BMPs and no-disturbance buffers would minimize sediment delivery from harvest units to the stream system. Timber harvest activities would be unlikely to cause any new landslides in the project area (0.7 slide is predicted). No new road construction is proposed in this alternative.

## Cumulative Effects

Within the Licking Creek project area, 2,954 acres have been harvested to date on National Forest System lands, with 264 acres occurring on slopes greater than 72 percent. An additional 103.4 acres have been harvested on private lands, 10.3 acres of which were on slopes greater than 72 percent. No timber sales are proposed for this private land parcel in the foreseeable future, and there would be no additional effects upon unstable soils.

Currently, two timber sales have signed decisions and are scheduled to be sold within the Licking Creek project area. As part of the Madder Timber Sale, 249 acres are scheduled for harvest, of which 3.8 acres are on slopes greater than 72 percent. No slopes greater than 72 percent are located within the 9-acre Mop Pt./91 Knot Timber Sale unit.

Action alternatives for the Licking Creek project include harvest between 9.0 and 37.8 acres on slopes greater than 72 percent. In the reasonably foreseeable future, between 3,109 acres (Alternative 4) and 3,685 acres (Alternative 6) would be available for harvest upon completion of the Licking Creek project (see Silviculture and Timber Management, Table 3-38). All projects must conform to Forest Plan Standards and Guidelines.

## Subsistence

The following discussions and analyses are based on the detailed subsistence information and analyses contained in the Subsistence and Communities sections, Chapter 3, Appendix H of the Forest Plan Final EIS. Federal management of fisheries resources in navigable streams commenced on October 1, 1999. Federal management of subsistence resources other than fish commenced on July 1, 1990. The Watershed and Fisheries and Wildlife sections of this chapter contain additional analyses of habitats and populations of fish, deer, and other wildlife species. The identification, protection, and interpretation of cultural and historic resources are addressed by the National Historic Preservation Act, and are discussed in the Heritage section of this chapter.

## Affected Environment

Subsistence is a broad term applied to the use by rural Alaskans of many natural resources. In the Alaska National Interest Lands Conservation Act (ANILCA, 16 USC 3113) of 1980, subsistence is defined, in part, as "the customary and traditional uses by rural Alaskan residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation" (ANILCA Sec. 803). The Act provides for the continuation of these uses "consistent with sound management principles and the conservation of healthy populations of fish and wildlife" (ANILCA Sec. 802). It also states, in part, under Section 804 that "...the taking on public lands of fish and wildlife for non-wasteful subsistence uses shall be accorded priority over the taking on such lands of fish and wildlife for other purposes." For many rural Alaskans, subsistence is a way of life that embodies deep cultural and religious meaning.

ANILCA requires that Federal agencies with jurisdiction over public lands in Alaska to evaluate potential effects of management activities on subsistence resources and uses (ANILCA Sec. 810). To evaluate potential effects, an analysis typically focuses on food-related resources that are most likely to be affected by habitat loss or alteration associated with land management activities. The analysis usually considers three factors related to subsistence uses: 1) resource distribution and abundance (ANILCA Section 810, Forest Plan pg. 4-86#C&87#J), 2) access to resources (ANILCA Section 811, Forest Plan pg. 4-87#I), and 3) competition for the use of resources (ANILCA Section 804, Forest Plan pg. 4-87#1A3). The evaluation determines whether subsistence uses within the project area or portions thereof may be significantly restricted by any of the proposed alternatives. Under ANILCA, if it is concluded that land management activities may impose a significant restriction on subsistence resources or uses, additional analyses and findings are required. The Alaska Land Use Council defines a significant restriction on subsistence uses as follows:

"A Proposed Action shall be considered to significantly restrict subsistence uses if, after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents."

A finding of "significant restriction" would require that the Proposed Action: 1) be modified to remove the significant restriction, 2) be dropped, or 3) may proceed with the stipulation that formal subsistence hearings are held and subsequent findings published.

### Subsistence Hearings Requirement

The Forest Plan Final EIS provided a comprehensive analysis of subsistence resources and potential effects of management activities for both the Tongass National Forest and for each

## Subsistence and ANILCA

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rural community in Southeast Alaska. That analysis concluded that Forest-wide, under full implementation of the Forest Plan, the only subsistence resource that may be significantly restricted in the future by Federal forest management activities is subsistence use of deer (Forest Plan Final EIS, p. 3-224 to 3-229). Therefore, the Forest Service is conducting subsistence hearings for all upcoming timber sale EISs, regardless of the individual project finding of significant or insignificant impacts. The subsistence hearing for Licking Creek was held in Saxman on January 8, 2003.

## Affected Environment

### Subsistence Resources Use Forest-wide

In Southeast Alaska, all communities except Juneau and Ketchikan are designated as rural communities under ANILCA. The Federal subsistence law states that only rural Alaska residents qualify for subsistence hunting and fishing on Federal lands. Salmon and other finfish, shellfish, marine plants and mammals, terrestrial wildlife including deer and other mammals, berries, cedar bark, and timber are all subsistence resources harvested by rural communities in Southeast Alaska. Eighty-five percent of rural Southeast Alaska households reported harvesting subsistence food (Kruse and Muth 1990), and almost one-third of rural households obtained at least half of their food from harvest of subsistence resources. By weight, fish and marine invertebrates accounted for 61 percent of subsistence resource harvest. Deer, other land mammals, and marine mammals represented 21, 4, and 3 percent, respectively, of subsistence harvest (Forest Plan, Final EIS, p. 3-224). In the event of a restriction on the use of subsistence resources, rural residents would have priority over non-rural residents for the use of those resources on Federal lands.

### Subsistence Resources and Use in the Project Area

Subsistence use of resources such as deer, salmon, seals and shrimp has historically occurred in Carroll Inlet. The only two rural communities with documented subsistence uses of Carroll Inlet, including the project area, are Metlakatla and Saxman (Forest Plan, Final EIS, p. 3-605 and 3-641). Ketchikan is classified as a non-rural community and residents are not eligible under Federal subsistence regulations. Subsistence use was confirmed during meetings with tribal representatives from Saxman and Metlakatla. They reported that individuals from Prince of Wales Island also hunt deer in the Licking Creek area, and confirmed the use of Carroll Inlet for fishing activities.

No concerns over any subsistence resources in the project area were reported by subsistence users, either during project scoping, at meetings with tribal representatives, during the public comment period after the Draft EIS was published, or at the subsistence hearing (see Appendix C, Subsistence Hearing Transcript). Therefore, based upon Forest Plan level concerns, analysis focuses on the impacts of the proposed alternatives on the abundance and distribution of, access to, and competition for deer.

### Deer Distribution and Abundance

Information on the distribution and abundance of deer in the project area is based primarily on the interagency deer model, which estimates changes in winter deer habitat that result from timber management activities. Deer habitat capability is described in detail in the Wildlife section of this chapter.

### Access to Deer

Access to the project area is by boat or plane. Most deer harvest occurs along the shoreline or roads. Since the existing road system is isolated from other road systems, roads are generally used to facilitate walk-in hunting. Some use of 4-wheelers also occurs. Vehicles probably would be used during the period that logging occurs.

### Competition for the Use of Deer

Competition for resources generally occurs where resources are accessible to a large number of people. Refer to Forest Plan Final EIS pages 3-222 and 3-223 for an in-depth discussion. A deer population at carrying capacity should be able to support a hunter harvest (demand) of



approximately 10 percent of the habitat capability to be sustainable and provide a reasonably high level of hunter success. Hunter success can be expected to decline in areas where demand represents 10 to 20 percent of habitat capability. If demand exceeds 20 percent of habitat capability, harvest of deer by hunters may be directly or indirectly restricted (Forest Plan Final EIS, p. 3-361).

An average of two deer per year was taken by hunters from rural communities in WAA 406, and an average of 94 deer per year was taken by hunters from rural and non-rural communities combined from 1996-2001, which is approximately 3 percent of habitat capability (Table 3-42). The numbers reported above are estimates based on ADF&G hunter surveys, which may underestimate actual deer harvest, sometimes substantially (D. Person, personal communication).

## Environmental Consequences

### Effects on Deer Distribution and Abundance

Information on the distribution and abundance of deer in the project area is based primarily on the interagency deer model, which estimates changes in winter deer habitat that result from timber management activities. Model results and the impact of timber harvest on deer habitat capability are described in detail in the Wildlife section of this chapter. Declines in deer habitat are measurable and would occur under all action alternatives in areas where old-growth forest is converted into second-growth stands through timber harvest. The proposed timber harvest in this project would reduce current deer habitat capability within WAA 406 by about 3 percent, leaving 77 percent of historical (1954) habitat levels immediately after harvest. As a result, all of the action alternatives would have a minimal effect on the subsistence use of deer in either WAA 406 or the project area.

### Effects on Access

Project-related activities would not restrict access to deer for subsistence use. Most deer harvest occurs along the shoreline or roads. Existing roads currently provide access to four-wheelers and walk-in hunters. Access to deer could be temporarily increased under some alternatives. Roads proposed under Alternatives 2, 3, and 4 could provide a slight increase in access to areas in which to hunt deer in the project area. Of the action alternatives, Alternatives 5 and 6 would provide the least change in existing access by building no new classified road. Although all new roads are proposed to be closed after completion of timber harvest and silvicultural activities, they could expand opportunities for walk-in deer hunting. They may also allow hunters to hunt the areas more effectively and increase hunting success. Additional roads would not likely increase the number of hunters, since all access to the project area is by boat or plane, although hunting pressure is likely to increase during project implementation from road construction and logging crews.

### Effects on Competition

Most deer hunting in WAA 406 is done by Ketchikan residents (non-subsistence users). Subsistence users come from Metlakatla and Saxman (ADF&G, deer harvest data). Forest Plan assumptions for hunter demand project an 18 percent increase for each of the first 2 decades and a 15 percent increase for each of the following 3 decades (Forest Plan Final EIS, page 3-528). Subsistence hunter demand for deer is expected to remain below 1 percent and total hunter demand to remain below 10 percent of the habitat capability for WAA 406 by year 2005 or 2035 (Table 3-42). Therefore, projected use levels should be sustainable and provide a reasonably high level of hunter success.

## Direct and Indirect Effects

Table 3-42  
Estimated Deer Harvest by Rural and All Hunters in WAA 406

	Deer Habitat Capability <sup>1</sup>	Rural Hunters (% of Habitat Capability)	Rural plus Non- rural Hunters <sup>3</sup> (% of Habitat Capability)
WAA 406, Year 1996-2001	3,703	2 (<0.1%)	94 (2.5%)
WAA 406 Projected Deer Demand, Yearly Harvest Numbers 2005 <sup>2</sup>	3,577	2 (<0.1%)	111 (3.1%)
WAA 406 Projected Deer Demand, Year 2035	2,835	4 (0.1%)	199 (7.0%)

<sup>1</sup>Based on interagency deer model; these numbers are for comparison purposes only; they do not reflect actual, known numbers of deer.

<sup>2</sup>Alternative 4 has the greatest effect so it was used to portray maximum potential effects.

<sup>3</sup>Hunter numbers based on ADF&G hunter surveys.

Source: J. Llanos, 2001; number of future hunters calculated from Forest Plan demand projections.

## Effects on Other Subsistence Uses

The Licking Creek project area is not known to be important for other subsistence uses. However, subsistence testimony revealed that some rural residents do use the waters of Carroll Inlet for shrimp. All of the action alternatives would have a minimal effect on anadromous fisheries and marine resources in or adjacent to the project area. (See the Watershed and Fisheries and Log Transfer Facilities sections in this chapter.)

## Cumulative Effects

The cumulative effects of this project, reasonably foreseeable actions and other timber harvest planned in WAA 406 on subsistence use are similar to the direct and indirect effects discussed above. The proposed timber harvest, combined with harvest that will occur from the Madder, Buckdance, and Mop Point/91 Knot Timber Sales would reduce current old-growth habitat within WAA 406 by about 4 percent, leaving 80 percent of historical (1954) POG. The private lands in the WAA were considered to have zero value as deer habitat (worst case scenario) and there would be no additional effects on habitat from these ownerships. The private land parcel in the Licking Creek project area was harvested in 1974; no timber sales are proposed for this parcel in the foreseeable future. Cumulative effects to subsistence access and availability are similar to the discussion above, and could be expected to increase proportionally to any additional timber harvest and road building in WAA 406.

## Finding

Distribution and abundance of subsistence resources, and access to them, are not likely to be to be changed or restricted by management activities related to the Licking Creek timber sale. Access to the project area is by boat or plane, so the number of hunters to the area is not likely to increase as a result of the proposed activities. The number of subsistence users of the project area and surrounding landscape is low compared to the number of non-rural users. The combined numbers for these two user groups is within the level predicted to be sustainable. Therefore, the subsistence use in the area is not likely to be restricted from the management activities proposed by the Licking Creek project. Demand for deer on the project area and competition between rural and non-rural hunters for subsistence resources is not likely to increase from timber harvest or road building in the Licking Creek project area.

For all subsistence resources, it is not expected that project-related, or reasonably foreseeable future activities, would cause a significant possibility of a significant restriction in subsistence resources or uses in WAA 406 or the Licking Creek project area.

## Threatened, Endangered and Sensitive Species

This section describes the occurrence of and project effects on species that are federally listed, or are proposed for threatened or endangered status. It also includes equivalent information on Forest Service sensitive species. It is based on the Biological Assessment and Biological Evaluation that was prepared for the Licking Creek Timber Sale as required by Section 7 of the Endangered Species Act (ESA), as amended, and the USDA Forest Service Threatened, Endangered and Sensitive Plant and Animal Species Policy (FSM 2670). The BA/BE is available in the Licking Creek project planning record.

The Licking Creek project is located entirely within the boundaries of the area analyzed in the Sea Level Timber Sale EIS. The Sea Level Record of Decision was signed on May 3, 1999. The findings in this section, for wildlife and fish species, are based largely on those reported in the Sea Level BA/BE and on analyses and inventories presented in the Sea Level Timber Sale EIS.

### Affected Environment

#### Threatened and Endangered Species

Federally listed threatened and endangered species are those plant and animal species formally listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) under the authority of the Endangered Species Act of 1973, as amended. Threatened and endangered species potentially occurring in the project area were identified through consultation with the USFWS and the NMFS. Consultation correspondence is located in the project planning record. Humpback whales and Steller sea lions may occur in waters adjacent to the project area; these waters are not designated as critical habitat for either species.

#### Humpback Whale

Humpback whales are occasionally found in waters bordering the project area. The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids (shrimp-like crustaceans). Important feeding areas in Alaska waters include Glacier Bay and adjacent portions of Icy Strait, Stephen's Passage/Frederick Sound, Seymour Canal, and Sitka Sound. None of these are within or adjacent to the project area. There would be no effect on humpback whales under any alternative.

#### Steller Sea Lion

Steller sea lions range from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, the Gulf of Alaska, Southeastern Alaska, and south to central California. They are occasionally found in waters bordering the project area. Information on Steller sea lion population trends in Southeast Alaska is limited but suggests that populations are stable. There are no known Steller sea lion haul-out locations in Carroll Inlet; the closest is near Grindall Island, near Prince of Wales Island, about 30 air miles to the west. They have also been noted a few times on rocks in Behm Canal near the mouth of Neets Bay, approximately 20 miles northwest of the project area. There would be no effect on Steller sea lions under any alternative.

#### Other

Other threatened or endangered species occur in Alaska. However, these other species are not expected to occur in or adjacent to the proposed Licking Creek project: Eskimo curlew, short-tailed albatross, spectacled eider, Steller's eider, Aleutian shield fern, several Pacific Northwest salmon and steelhead stocks, blue whale, fin whale, sei whale, right whale, sperm whale,

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bowhead whale, and leatherback/loggerhead/olive ridley/green sea turtles. See the Supplement to the BA/BE for further information on why these species were eliminated from consideration for this project.

## Forest Service Sensitive Species

The Forest Service Regional Forester may also designate as "sensitive" species for which a viability concern has been identified due to a predicted or documented downward trend in populations or habitat and where continued downward trends may lead to local or forest-wide extirpation, Federal listing under the Endangered Species Act, or both. The 14 sensitive plant and animal species that could potentially occur in or near the Licking Creek project area are summarized in Table 3-43. A complete analysis of sensitive species that may potentially be impacted by the Licking Creek project has been prepared and presented in the Biological Assessment and Biological Evaluation (BA/BE), which is available in the project planning record.

The Licking Creek project area is entirely within the boundary of the Sea Level Timber Sale EIS. From 1993 to 2000, field crews completed goshawk surveys along 87 routes, which included 512 broadcast stations, within the Sea Level project area. Approximately 387 call stations were located in or adjacent to potential Sea Level harvest units. In addition, long watches (Crocker-Bedford, 1997) and early morning listening stations (Penteriani, 1999) were done. Goshawk surveys followed the protocol established for the Alaska Region Goshawk Inventory Protocol, first issued on June 24, 1992. Field crews found no goshawk nests, but reported a possible goshawk detection in 1995. District records and databases indicate several incidental goshawk sightings within the Sea Level project area. The two most dependable sightings both occurred in 1996. Wildlife crews surveyed these areas but did not locate a nest or record additional goshawk detections. Additional surveys were conducted during 2002 for goshawks, also with no detections.



Table 3-43  
Alaska Region Sensitive Species that May Occur in the Licking Creek Project Area

Common Name	Scientific Name	Surveys Conducted?	Observed in Project Area?	Determination
Queen Charlotte goshawk	<i>Accipiter gentilis laingi</i>	Yes	No	May affect <sup>1</sup>
Trumpeter swan	<i>Cygnus buccinator</i>	Yes	Yes	Not adverse <sup>2</sup>
Osprey	<i>Pandion haliaetus</i>	No	No	No effect
Peale's peregrine falcon	<i>Falco peregrinus pealei</i>	No	No	No effect
Goose-grass sedge	<i>Carex lenticularis var. dolia</i>	Yes	Yes	No effect
Edible thistle	<i>Cirsium edule</i>	Yes	No	No effect
Davy mannagrass	<i>Glyceria leptostachya</i>	Yes	Yes	Not adverse
Wright filmy fern	<i>Hymenophyllum wrightii</i>	Yes	No	May affect
Truncate quillwort	<i>Isoetes truncata</i>	Yes	No	No effect
Calder's lovage	<i>Ligusticum calderi</i>	Yes	No	Not adverse
Bog orchid	<i>Platanthera gracilis</i>	Yes	No	No effect
Loose-flowered bluegrass	<i>Poa laxiflora</i>	Yes	No	Not adverse
Unalaska mist-maid	<i>Romanzoffia unalaschcensis</i>	Yes	No	No effect
Queen Charlotte butterweed	<i>Senecio moresbiensis</i>	Yes	No	Not adverse

<sup>1</sup> May affect individuals; not likely to adversely affect population viability

<sup>2</sup> Not likely to adversely affect

Source: J. Zelenak, K. Dillman, 2001

## Environmental Consequences

### Direct and Indirect Effects

No adverse effects to whales or sea lions are anticipated from implementation of any of the alternatives. Important feeding and haul-out areas for these species are not known to occur in waters adjacent to Licking Creek project area nor are the waters near the project area designated as critical habitat. Forest Plan Standards and Guidelines for threatened and endangered species (Forest Plan S&G I.A., B., & C., page 4-88 and VII. A. page 4-114) are being met. All project-related activities would be conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and National Marine Fisheries Service regulations for approaching whales, sea lions, and other marine mammals.

Most goshawk nesting habitat is within the protected beach/estuary and riparian reserves. Approximately 20 percent of the productive old growth (POG) and 26 percent of the low-elevation POG in the project area is in the beach/estuary and riparian buffers. Five units were

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harvested in the beach buffer between 1954 and 1962 and have resulted in approximately 284 acres of second-growth stands in the “stem exclusion” stage. Alternatives 2 through 6 would decrease low-elevation POG by 1 to 5 percent in the VCU. Approximately 26 to 29 percent of the VCU would be in second growth, which is consistent with viability strategies.

All alternatives fully incorporate Forest Plan Standards and Guidelines for trumpeter swans. These forbid disturbance of trumpeter swans, particularly during the nesting, brood-rearing, and wintering periods. If trumpeter swans are observed using habitats within the project area, road building and timber harvesting would be prohibited within 0.5 miles of these habitats when swans are present (usually from November 1 to April 1).

No breeding pairs of osprey or nests have been recorded on the project area. However, migrating birds may stop at small lakes and streams to rest and feed. Only one small lake occurs within the project area. No harvest would occur within the adjacent riparian buffer zones. Therefore, none of the action alternatives would impact ospreys.

No nest sites for Peale’s peregrine falcon have been found in the project area, nor have any observations been reported. There would be no impact on this species.

Goose-grass sedge and Davy mannagrass were the only sensitive plant species recorded in the project area. Because goose-grass sedge is expected to occur in subalpine habitats, no effects are anticipated from this project. Forest Plan Standards and Guidelines protect most of Davy mannagrass habitat from disturbance, though smaller streams may not receive buffers in the project. Populations were found well outside any proposed unit boundary near Unit 1. The probability of adverse effects are low because the habitats they occupy are sub-alpine and will not be included in the timber base for harvest. Therefore, the overall risk to this species due to project activities is low; hence the determination is “not likely to adversely affect”.

## Cumulative Effects

### Alternative 1

The No-action Alternative would have no adverse effects on any threatened, endangered or sensitive animal or plant species in the project area. Viable populations would be maintained in the project area and larger landscape.

### Alternatives 2, 3, 4, 5 and 6

The majority of threatened, endangered, and sensitive animal and plant species do not occur in the project area, and would not be affected. Twenty-nine to 32 percent of VCU 7460 would be second growth under the cumulative impact of Alternatives 2 through 6 and other foreseeable sales in the area. This is consistent with goshawk viability strategies.

## Wetlands and Floodplains

This section reviews the existing information on the Licking Creek project area for management of wetlands. Information from the Forest Service's GIS database, and field surveys of the project area were used. A Forest-wide treatment of wetlands may be found in the Water section of the Forest Plan Final EIS, Chapter 3, and the Forest Plan, Chapter 4. The unit and road cards (Appendix B of the Draft EIS) contain additional site-specific mitigation measures for implementation.

### Affected Environment

#### Wetlands

Wetlands are defined as: "those areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40 CFR 230.41(a)(1)). Identification of wetlands is based on the Corps of Engineers three-parameter system described in U.S. Army Corps of Engineers Wetlands Delineation Manual (COE 1987). Wetlands are identified as areas having hydric soils, hydrophytic vegetation, and wetland hydrology. Soil resource inventory maps, including correlations between soil series and plant communities were used to determine the extent of wetlands in the project area. Hydrologic parameters are inferred from the soil moisture regime.

Using this wetland definition and delineation method, approximately 31 percent (4,494 acres) of the Licking Creek project area is classified as wetlands (Table 3-44).

Wetlands provide various ecological functions, including surface flow and groundwater regulation, sediment retention, nutrient storage, and temperature moderation. They provide terrestrial, aquatic and marine wildlife habitats, biological diversity, and wood fiber. Wetland areas also provide socio-economic benefits, which include areas for wildlife viewing, hunting and recreation, habitat for commercial fishing (salmon) stocks, development sites (such as buildings and roads), community water supplies, and timber harvesting.

#### Wetland Types

Six broad types of wetlands occur on the project area. These wetland types have different soil and vegetative communities, occupy different landscape positions, and have somewhat different functions and values.

**Muskeg** – Bogs (commonly called muskegs) are dominated by sphagnum moss with a wide variety of other plants adapted to very wet, acidic, organic soils. They typically contain some stunted lodgepole pine and hemlock trees. This wetland type includes raised bogs, sloping "poor fens," and some shrub-scrub coniferous wetlands. Muskegs function as areas of groundwater recharge and streams and for deposition and storage of sediment and nutrients, and provide biological and vegetative diversity in the landscape. Muskegs are most commonly found in broad valley bottoms, on rounded hilltops and on rolling lowlands in the project area.

**Alpine/Subalpine Muskeg** – This type is a combination of muskeg and sedge meadows on peat deposits, and low-growing blueberry and heath on higher rises. Stunted lodgepole pine and mountain hemlock are common. These wetlands are important for snow storage and can be a source of snowmelt water throughout the summer. They also provide summer habitat for terrestrial wildlife species. These wetlands are located at elevations of 1,200 to 2,500 feet. Many of these habitats in the Licking Creek project area are heavily used during the summer months by deer and bear.

**Sedge Fens** – Fens are diverse communities of sedges, dominated by tall sedges such as Sitka sedge, with a variety of forbs and occasional stunted trees, usually spruce or hemlock. Soils are

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deep organic muck, often with thin layers of alluvial mineral soil. They occur in landscape positions where they receive some runoff from adjacent slopes, resulting in richer nutrient status than muskegs. These wetlands function as areas for recharge of groundwater and streams, deposition and storage of sediment and nutrients, and as waterfowl and terrestrial wildlife habitat, including black bear, mink, river otter, and beaver. Many sedge fens contain beaver ponds that provide high-quality waterfowl and salmon-rearing habitat.

**Forested Wetlands**— These wetlands typically have hemlock, cedar, or mixed conifer overstories, and ground cover consisting largely of skunk cabbage and deer cabbage. They occur on poorly or very poorly drained hydric soils. They are most common on broad glacial valley bottoms, and on gently sloping hillslopes or benches. These wetlands function as recharge areas for groundwater and streams, and for deposition of sediment and nutrients. They also produce commercial forest products.

**Muskeg/Forested Wetland Mosaic** — Small patches of muskegs and forested wetlands can be arranged in a mosaic pattern on the landscape. The vegetation in these types are the same as described above, but function somewhat differently as habitats due to their small size and spatial arrangement.

**Forested Wetland/Upland Mosaic** — Small patches of forested wetland can occur intermixed with forested non-wetland ecosystems. The wetland portion is typically in concave areas within gently sloping or rolling landscapes.

Wetland types that are relatively scarce within the larger landscape may be considered more biologically significant. In the Licking Creek project area, sedge fens, lower-elevation muskegs, and lakes and ponds are the least-abundant wetland types (Table 3-44).

Table 3-44  
Wetland Types in the Licking Creek Project Area

Wetland Type <sup>1</sup>	Approximate Number of Acres within Project Area	Percent of Project Area
Alpine/Subalpine Muskeg	1,965	14%
Forested Wetlands	1,309	9%
Sedge Fens	131	0.9%
Lakes and Ponds	3	0.02%
Muskeg	148	1%
Muskeg/Forested Wetland Mosaic	413	3%
Forested Wetland/Upland Mosaic	525	4%
<b>Total Wetlands<sup>1</sup></b>	<b>4,494</b>	<b>31%</b>
Uplands (Non-Wetlands)	9,951	69%

<sup>1</sup> Sum total of individual percentages may not equal 100% due to rounding errors.

Source: P. Frohne, GIS, 2001

#### Effects of Past Timber Harvest on Wetlands

Section 404 (f) (1) (A) and (E) of the Federal Clean Water Act exempts silvicultural, timber harvesting, and related road construction activities from permit requirements for the discharge of dredge and fill materials in wetlands. Executive Order 11990, as amended (42 U.S.C. 4321 et seq.), however, requires Federal agencies having statutory authority and leadership over Federal lands to avoid, to the extent possible, the short- and long-term adverse impacts associated with the destruction or modification of wetlands. Where feasible, direct and indirect support of new construction in wetlands must be avoided. Federal agencies are also required to preserve or enhance the beneficial values of wetlands in their land management actions.



The predominant effect of timber harvest activities on wetlands is from excavating or filling for features such as roads, landings, and log transfer facilities. Roads are located outside of wetlands, to the maximum extent practicable, to maintain their function. Where it is necessary to cross wetlands, appropriate BMPs and mitigation measures are incorporated into road designs. Road construction covers wetland vegetation with rock, resulting in permanent loss of wetlands covered by the road prism, and in subtle changes in vegetation for distances of up to 20 feet on the downhill side of the road. By minimizing the amount of side-ditching, effects upon groundwater flow and alteration of soil moisture levels are minimized. McGee (2000) found that drainage ditches collect and divert overland flow and shallow subsurface flow to the nearest stream channel, resulting in minimal effects on soil wetness in the soil adjacent to the road prism.

Harvesting timber from forested wetlands temporarily changes the hydrology of the site and may cause an increase in water yield (Patric 1966), due to the reduction in forested vegetation. Forest vegetation evaporates and transpires water from the soil, and soil moisture may be elevated until adequate re-growth has occurred. These conditions typically persist longer than on upland sites, as tree growth on wetland sites is slower than on adjacent upland sites.

Table 3-45 shows the existing miles of road and previous timber harvest that have occurred on wetlands (on National Forest System acres) across the Licking Creek project area.

**Table 3-45**  
**Existing Miles of Road and Past Harvest on Wetlands and Non-wetlands**  
**(Watersheds)<sup>1</sup>**

	Existing Miles of Road	Past Harvest
Wetlands	9.56	564 acres
Non-wetlands	28.60	3,314 acres
<b>Total</b>	<b>38.16</b>	<b>3,878 acres</b>

<sup>1</sup> Total is calculated on a watershed scale for the project area. Since watershed boundaries extend outside the project area, totals shown here are greater than within the project area alone.  
Source: P. Frohne, GIS 2001

## Floodplains

Floodplains are composed of naturally eroded sediments carried by a stream or river and deposited in slack-water sections of channels during high-water periods. Floodplains are considered to be areas subject to a 1 percent or greater chance of flooding in any given year (at least 1 year in 100-year recurrence). Floodplain soils are formed in waterborne sediments (alluvium). Alluvial fans are formed where streams and rivers transition from fast-moving water (high-gradient) to slow-moving (low gradient), and soil materials are deposited by gravity. Floodplain and alluvial fan soils in the project area are typically coarse textured and well drained. Alluvial fans provide fish-rearing habitat. Wildlife use floodplains for forage and travel corridors.

Approximately 437 acres of floodplains and alluvial fans are within the Licking Creek project area. Current Forest-wide Riparian Standards and Guidelines prohibit timber harvest on the active portion of floodplains. A total of 1.19 miles of existing roads cross floodplains. None of the alternatives propose new road construction in floodplains. Consequently, potential effects on floodplains would be negligible, and they are not discussed further.

## Environmental Consequences

### Direct and Indirect Effects

The predominant effect of the proposed project upon wetlands would be from road construction. It is not always possible, or desirable, to locate forest roads on upland sites rather than on wetlands. However, the proportion of wetlands in the project area being converted to roads is relatively small (Table 3-46), and no roads are proposed to be constructed on the most biologically significant wetlands within the project area. Appropriate BMPs and mitigation measures would be incorporated into road designs. If Alternative 1 were chosen, the existing wetlands would continue to function in their current state. More miles of new road would be constructed on wetlands under Alternative 4 than under Alternatives 2 or 3. Alternative 5 builds no new roads.

Table 3-46  
Miles of Proposed Road on Wetlands by Wetland Type (Watersheds)<sup>1</sup>

Wetland Type	Alt. 1 <sup>1,3</sup> (existing)	Alt. 2 <sup>3</sup> (new)	Alt. 3 <sup>3</sup> (new)	Alt. 4 <sup>3</sup> (new)	Alt. 5 <sup>3</sup> (new)	Alt. 6 <sup>3</sup> (new)
Alpine/Subalpine Muskeg	0.48	0.06	0.06	0	0	0
Forested Wetlands	6.62	0	0	0	0	0
Sedge Fens	0.13	0	0	0	0	0
Lakes and Ponds	0	0	0	0	0	0
Muskeg	1.19	0.24	0.24	0.30	0	0
Muskeg/Forested Wetland Mosaic	0	0	0	0	0	0
Forested Wetland/Upland Mosaic	1.14	0	0	0	0	0
<b>Total (Road Miles on Wetlands)<sup>1,3</sup></b>	<b>9.56</b>	<b>0.30</b>	<b>0.30</b>	<b>0.30</b>	<b>0</b>	<b>0</b>
Acres of wetland converted to road <sup>2</sup>	27.72	0.87	0.87	0.87	0	0
Cumulative wetland acres converted to road	27.72	28.59	28.59	28.59	27.72	27.72

<sup>1</sup> Total is calculated on a watershed scale for the project area. Since watershed boundaries extend outside the project area, totals shown here are greater than within the project area alone.

<sup>2</sup> Based on 2.9 acres of disturbance per mile of constructed road.

<sup>3</sup> Alt. 1 displays currently existing road miles and acres. Alts. 2, 3, and 4 display the additional miles and acres that would be added to the existing condition, under each action alternative.

Source: P. Frohne, 2002, 2003

Classified roads typically include a road surface of approximately 16-foot width and a varying width roadside ditch and/or fill-slope, depending upon slope, topography, soil type, and drainage. Effects of road building in wetlands will be minimized by avoiding overburden disposal in wetlands, along with minimizing road clearing limits and side-ditching. (Refer to the road cards in Appendix B of the Draft EIS for details.)

Table 3-47 displays the acreage of proposed harvest under each alternative. Alternative 4 proposes the most forested wetland harvest of the action alternatives, followed by Alternatives 5, 3, 2, and 6.

Soil moisture would be elevated until transpiration and interception surfaces were equivalent to pre-harvest conditions, and water yield may increase.

Table 3-47  
Proposed Timber Harvest on Wetlands

	Previous Harvest	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
<b>Wetlands</b>							
Acres of proposed forested wetland <sup>1</sup> harvest	564	0	51	133	188	147	31
Percent of forested wetland acres <sup>1</sup> in project area	25%	0	2.2%	5.9%	8.4%	6.5%	1.4%
Percent of project area	3%	0	0.4%	0.9%	1.3%	1.0%	0.2%
<b>Non-wetlands</b>							
Acres of proposed harvest on non-wetlands	3,314	0	202	440	602	618	173
<b>Project Area Total</b>	<b>3,878</b>	<b>0</b>	<b>253</b>	<b>573</b>	<b>790</b>	<b>765</b>	<b>204</b>

<sup>1</sup> Includes forested wetland/upland mosaic and muskeg/forested wetland mosaic.  
Source: P. Frohne, 2001, 2002, 2003

## Alternative 1

No additional wetlands would be impacted in the project area.

## Alternative 2

The direct and indirect effects of Alternative 2 pose the fourth-highest risk to wetlands. Proposed activities would occur on 51.87 acres of wetlands, 0.87 of which would be permanently lost due to conversion to road.

## Alternative 3

The direct and indirect effects of Alternative 3 pose the third-highest risk to wetlands. Proposed activities would occur on 133.87 acres of wetlands, 0.87 of which would be permanently lost due to conversion to road.

## Alternative 4

The direct and indirect effects of Alternative 4 pose the highest risk to wetlands. Proposed activities would occur on 188.87 acres of wetlands, 0.87 of which would be permanently lost due to conversion to road.

## Alternative 5

The direct and indirect effects of Alternative 5 pose the second-highest risk to wetlands. Proposed activities would occur on 147.87 acres of wetlands, none of which would be permanently lost due to conversion to road.

## Alternative 6

The direct and indirect effects of Alternative 6 pose the lowest risk to wetlands of the action alternatives. Proposed activities would occur on 30.9 acres of wetlands, none of which would be permanently lost due to conversion to road.

## Cumulative Effects

Both past (1970-2001) and future activities (2002-2012) were reviewed to estimate the cumulative effects of timber harvest and associated roads on wetlands within the Licking Creek project area. Design specifications for National Forest System lands would minimize road placement on high-value wetlands (those that are scarce in the project area, such as sedge fens), unless unavoidable due to existing side-slope conditions. Approximately 9.56 miles of road have been constructed to date on wetlands within the project area. No existing roads on private land cross wetlands. Alternatives 2, 3, and 4 propose building 0.3 miles of road on wetlands, while Alternatives 5 and 6 propose no new road construction on wetlands. For the Madder Timber Sale, 0.4 miles of road will be constructed in wetlands. One 9-acre unit of the Mop Point/91 Knot Timber Sale is within the project area. It is estimated that 0.1 mile of road will be built to access this unit, none of which will be constructed on wetlands.

# 3 Environment and Effects

Approximately 564 acres of forested wetlands have been harvested to date on National Forest System lands within the project area. On private lands within the project area, 103.4 acres have been harvested, no acres of which were on wetlands. No timber sales are proposed for this parcel in the foreseeable future, and there would be no additional effects upon wetlands. Within the project area, 41 acres of forested wetland are scheduled for harvest as part of the Madder Timber Sale. Approximately 0.1 acre of forested wetland falls within the Mop Pt./91 Knot Timber Sale unit boundary. Action alternatives for the Licking Creek project range from 31 to 188 acres of forested wetland harvest.



## Other Environmental Considerations

Several resources and uses of the Licking Creek project area are likely to remain unaffected by the action alternatives, or would not be affected to a significant degree. Even though significant effects are not anticipated, we discussed the potential for measurable effects or differences between the alternatives in the preceding resource sections. Resources or uses for which no measurable effects were identified are discussed briefly here.

### Air Quality

All of the action alternatives would have limited, short-term effects on ambient air quality. Such effects, in the form of vehicle emissions and dust, are likely to be indistinguishable from other local sources of airborne particulates, including other motor vehicle emissions, dust from road construction and motor vehicle traffic, logging camp energy sources, and marine traffic. The action alternatives could result in short-term supplies of raw wood products to local mills. It is the responsibility of the mill owner or sortyard operator to ensure that mill emissions are within legal limits.

### Facilities

There are no logging camps or Forest Service administrative sites in the Licking Creek project area. The project area is approximately 20 miles northeast of Ketchikan, Alaska.

### Land Status

Under the Alaska Statehood Act of 1959, the State of Alaska is entitled to a certain amount of Federal land. Other legislation granted Alaska Native corporations similar selection rights. There are no State-selected lands, or lands selected by the Cape Fox Native Corporation, within the Licking Creek project area.

The implementation of the proposed alternatives would require the expenditure of energy (consumption of fuel). The amount of energy used varies by alternative, based upon the timber volume harvested, the type of harvest system used, the amount of road constructed, and the sale preparation and administration.

### Fuel Consumption

Fuel consumption estimates are based upon estimates. These estimates are likely to be a little high for the Licking Creek project due to logistical advantages of working on Revillagigedo Island versus more remote sites. Fuel consumption requirements were estimated as follows:

Timber Sale Preparation and Administration	1.56 gallons per MBF
Cable Logging	2.00 gallons per MBF
Helicopter Logging	8.00 gallons per MBF
Load, Haul, Dump, and Tow	8.00 gallons per MBF
Road Construction	4,000 gallons per mile
Road Maintenance	20 gallons per mile

The estimated fuel consumption required for each alternative is displayed in Table 3-48.

## Energy Requirements and Conservation Potential

### 3 Environment and Effects

Table 3-48  
Estimated Fuel Consumption by Alternative (in Thousands of Gallons)

Activity	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Logging	0	26,400	55,600	52,200	101,800	11,112
Load, Haul, Dump, Tow	0	43,200	95,200	134,400	128,800	44,480
Road Construction	0	6,000	8,800	22,000	0	0
Road Maintenance	0	1,280	2,560	3,040	2,880	1,280
Timber Sale Prep/ Administration	0	8,424	18,564	26,208	25,116	8,734
<b>Total Consumption</b>	<b>0</b>	<b>85,304</b>	<b>180,724</b>	<b>237,848</b>	<b>258,596</b>	<b>65,306</b>
Average Gallons/ MBF	0	15.80	15.19	14.16	16.06	11.80

Source: D. Fletcher 2002, S. McCoy 2003

#### Conservation Potential

To conserve fuel, and to minimize costs, the Forest Service has undertaken studies nationwide and on the Tongass National Forest. This has allowed experimentation with new or different techniques. Cable yarding uses about 75 percent as much fuel as shovel yarding and about 25 percent as much fuel as helicopter yarding. However, helicopter yarding can reduce road-building needs, saving fuel needed for road construction, road maintenance, and trucks hauling logs on the roads.

The use of low-tire-pressure equipment during road construction and logging has also been shown to decrease costs, both in nationwide studies and in studies on the Tongass. Studies on Mitkof Island indicate that 10-14 percent less rock was needed during road construction, resulting in a cost savings of approximately \$450,000. It is predicted that costs for rock replacement/road maintenance, log truck fuel, and tire repair/replacement will decrease using this system. Cost savings have been proven to be substantial enough that the Forest Service provides a contract provision allowing a reduction in deposits for rock replacement when low-tire-pressure equipment is used.

The use of cable yarding equipment fitted with mechanical or hydraulic interlocks reduces yarding costs, because one does not have to ride the throttle and brake simultaneously to provide deflection for the turn of logs.

# Chapter 4

## Lists





# Chapter 4

## Lists

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## Glossary

### Access

The opportunity to approach, enter, and make use of public lands.

### Access Management

Acquiring rights and developing and maintaining facilities needed by people to get to and move through public lands (physical attributes).

### Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 National Forest Wilderness areas in Southeast Alaska. The Alaska National Interest Lands Conservation Act of December 2, 1980, Public Law 96-487, 96th Congress, 94 Stat. 2371-2551, Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

### Native Claims Settlement Act (ANCSA) Alaska Native Claims Settlement Act (ANCSA)

Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, Native Claims Settlement Act (ANCSA) ANCSA provides for the settlement of certain land claims of Alaska Natives and for other purposes.

### Adfluvial

Adfluvial habitat is a tributary stream that provides spawning and juvenile rearing habitat for salmonids that grow to maturity in a lake and then return to spawn in the tributary. An adfluvial fish is a species or population of fish that does not go to sea, but lives in lakes and enters streams to spawn.

### Alluvial Fan

A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

### Alpine

Parts of mountains above tree growth and/or the organisms living there.

### Alternative

One of several policies, plans, or projects proposed for decision making.

### Anadromous Fish

Anadromous fish (such as salmon, steelhead, and sea-run cutthroat trout) spend part of their lives in freshwater and part of their lives in saltwater.

### Aquatic Habitat Management Unit (AMHU)

A mapping unit that displays an identified value for aquatic resources. It is a mechanism for carrying out aquatic resource management policy.

*Class I:* Streams and lakes with anadromous or adfluvial fish habitat, or high-quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat Management Handbook (FSH 2609.24), June 1986; or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.

*Class II:* Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-5 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.

*Class III:* Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sufficient sediment and debris to have an immediate influence on downstream water quality or fish habitat capability. These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope.

*Class IV:* Intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.

*Non-streams:* Rills and other watercourses, generally intermittent and less than 1 foot in bankfull width, little or no incisement into the surrounding hillslope, and with little or no evidence of scour.

## **Background**

The distant part of a landscape. The seen or viewed area located from 3 or 5 miles to infinity from the viewer. (See "Foreground" and "Middleground".)

## **Beach Fringe**

The area inland from salt water shorelines, which is typically forested.

## **Bedload**

Sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water.

## **Best Management Practice (BMP)**

Practices used for the protection of water quality. BMPs are designed to prevent or reduce the amount of pollution from nonpoint sources or other adverse water quality impacts while meeting other goals and objectives. BMPs are standards to be achieved, not detailed or site-specific prescriptions or solutions. BMPs as defined in the USDA Forest Service Soil & Water Conservation Handbook are mandated for use in Region 10 under the Tongass Timber Reform Act.

## **Biological Diversity (Biodiversity)**

The variety of life in all its forms and at all levels. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all levels to interact and survive. The most familiar level of biological diversity is the species level, which is the number and abundance of plants, animals, and microorganisms.

## **Biological Potential**

The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

## **Blowdown**

See windthrow.

## **Board Foot (BF)**

A unit of wood 12" X 12" X 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering 1 acre 2 feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

## **Braided Streams or Channels**

A stream flowing in several dividing and reuniting channels resembling the strands of a braid, the cause of division being the obstruction by sediment deposited by the stream.

## **Buffer**

An area around a resource where timber harvest is restricted or prohibited. For example, the Tongass Timber Reform Act (TTRA) requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a "stream buffer".

## **Capability**

An evaluation of a resource's inherent potential for use.

## **Channel Migration**

Movement of a stream or river channel within a floodplain area usually over an extended period of time.

## **Clearcut**

The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Forest Service Manual 2410 R10 Supplement 2400-2002-1.

**Code of Federal Regulations (CFR)**

A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

**Commercial Forest Land (CFL)**

Productive Forest land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

*Normal CFL:* Timber that can be economically harvested with locally available logging systems. Composed of two categories:

*Standard:* Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

*Special:* Timber that is in areas where special consideration is needed to protect other resources but can be harvested with locally available logging systems.

*Non-standard CFL:* Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems such as helicopter or long-span skyline.

**Commercial Thinning**

Thinning a stand where the trees to be removed are large enough to sell.

**Connectivity**

A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

**Corridor**

Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

**Cover**

Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

**Critical Habitat**

Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

**Crown**

The tree canopy. The upper part of a tree or woody plant that carries the main branch system and foliage.

**Cruise**

Refers to the general activity of determining timber volumes and quality as opposed to a specific method.

**Cubic Foot (CF)**

Equivalent to a cube of wood with 1-foot sides. The cubic foot volume is a measure of the total sound wood in a tree and is a more accurate depiction of wood volume than the board foot measure. This is usually referred to in CCF (hundred cubic feet).

**Cull Logs**

Trees that do not meet certain quality specifications.

**Cumulative Effects**

The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.



**Cutover**

Areas harvested recently.

**Diameter Breast Height (DBH)**

The diameter of a tree measured 4 feet 6 inches from the ground.

**Deer Winter Range**

Locations that provide food and shelter for Sitka black-tail deer under moderately severe to severe winter conditions.

**Degradation**

The general lowering of the surface of the land by erosive processes, especially by the removal of material through erosion and transportation by flowing water.

**Developed Recreation**

Recreation that requires facilities that, in turn, result in concentrated use of an area. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, and buildings.

**Direct Effects**

Direct environmental effects are those occurring at the same time and place as the initial cause or action.

**Direct Employment**

The jobs that are immediately associated with the Long-term Contract Timber Sale, including, for example, logging, sawmills, and pulp mills.

**Diversity**

The distribution and abundance of different plant and animal communities and species within the area controlled by the modified 1997 Forest Plan.

**Draft Environmental Impact Statement (Draft EIS)**

A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

**Eagle Nest Tree Buffer Zone**

A 330-foot radius around eagle nest trees established in an agreement between the U.S. Fish and Wildlife Service and the Forest Service.

**Ecological Province**

Twenty-one ecological subdivisions of Southeast Alaska that are identified by generally distinct ecological, physiographic, and biogeographic features. Plant and animal species composition, climate, and geology within each province are generally more similar within than among adjacent provinces. Historical events (such as glaciers and uplifting) are important to the nature of the province and to the barriers that distinguish each province.

**Ecosystem**

A community of organisms and its physical setting. An ecosystem, whether a fallen log or an entire watershed, includes resident organisms, non-living components such as soil nutrients, inputs such as rainfall, and outputs such as organisms that disperse to other ecosystems.

**Effects**

Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.

## 4 Lists

*Direct Effects:* Results of an action occurring when and where the action takes place.

*Indirect Effects:* Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.

*Cumulative Effects:* See Cumulative Effects.

### **Encumbered Lands**

Lands with a claim, lien, charge, or liability attached to and binding real property.

### **Endangered Species**

Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as Endangered in accordance with the 1973 Endangered Species Act. See also Threatened Species, Sensitive Species.

### **Endemic**

Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a very few islands.

### **Erosion**

The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

### **Escapement**

Adult anadromous fish that escape from all causes of mortality (natural or human-caused) to return to streams to spawn.

### **Estuary**

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

### **Even-aged Management**

The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

### **Executive Order**

An order or regulation issued by the President or some administrative authority under his or her direction.

### **Final Environmental Impact Statement (Final EIS)**

The final version of the statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement (Draft EIS) to include public and agency responses to the draft. The decision maker chooses which alternative to select from the Final EIS, and subsequently issues a Record of Decision (ROD).

### **Floodplain**

That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

### **Fluvial**

Of or pertaining to streams and rivers.

### **Foreground**

The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also Background and Middleground.

### **Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)**

Amended in 1976 by the National Forest Management Act. See RPA Assessment and Program.

### **Forest or Forest Land**

National Forest lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.

### **Forested Wetland**

A wetland whose vegetation is characterized by an overstory of trees that are 20 feet or taller.

### **Forest Plan**

The Tongass Land Management Revision, signed in 1997. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

### **Fragmentation**

An element of biological diversity that describes the natural condition of habitats in terms of the size of discrete habitat blocks or patches, their distribution, the extent to which they are interconnected, and the effects of management on these natural conditions. Also the process of reducing the size and connectivity of stands within a Forest.

### **FSH**

Forest Service Handbook.

### **FSM**

Forest Service Manual.

### **Geographic Information System (GIS)**

An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site-specific information that can be electronically combined to provide reports and maps.

### **Geomorphology**

The study of the forms of the land surface and the processes producing them. Also the study of the underlying rocks or parent materials and the landforms present which were formed in geological time.

### **Guideline**

A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

### **Habitat**

The sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

### **Habitat Capability**

The number of healthy animals that a habitat can sustain. Used in wildlife models to calculate rough population estimates for management indicator species.

### **Habitat Suitability Index (HSI)**

This is a value assigned to a unit of land using a computerized model that related vegetative and geographic characteristic (e.g. stand volume, proximity to a stream or cliff, slope, aspect, etc.) to the land unit's value for a particular wildlife species. Values generally range from 0 to 1, with 1 being the best. The Habitat Capability Models used to generate HSIs were developed by interagency teams of biologists using the best available information including research results and best professional judgement.

### **Heritage Resources**

Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities.

### **Indirect Effects**

Indirect environmental effects are those that occur later in time or are spatially removed from the cause or action.

## **Indirect Employment**

The jobs in service industries that are associated with the Long-term Contract timber sale including, for example, suppliers of logging and milling equipment.

## **Inoperable Timber**

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

## **Interdisciplinary Team (IDT)**

A group of people with different backgrounds assembled to research, analyze, and write a project Environmental Impact Statement. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze a proposed action and its alternatives.

## **Irretrievable Commitment**

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. Such decisions are reversible, but the production opportunities foregone are irretrievable. The construction of roads for timber harvesting is an irretrievable action, because of the time needed for a constructed road to revert to natural conditions.

## **Irreversible Commitment**

Irreversible commitments are decisions affecting non-renewable resource such as soils, minerals, plant and animal species, and cultural resources. Such commitments are considered irreversible when the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or because the resource has been destroyed or removed. The conversion from an unroaded to a roaded state may be considered an irreversible commitment.

## **Issue**

A point, matter, or section of public discussion or interest to be addressed or decided.

## **Knutsen-Vandenburg Fund (KV)**

The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

## **Land Allocation**

The decision to use land for various resource management objectives to best satisfy the issues, concerns and opportunities and meet assigned forest output targets.

## **Land Use Designation**

A defined area of land specific to which management direction is applied in the modified 1997 Forest Plan.

## **Landslides**

The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

## **Large Woody Debris**

Any large piece of relatively stable woody material having a diameter of at least 4 inches and a length greater than 3 feet that intrudes into the stream channel. Also called Large Organic Debris (LOD).

## **Log Transfer Facility (LTF)**

A facility that is used for transferring commercially-harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility" or "log dump".

## **Logging Systems**

*Long-span cable:* Single span cable yarding system with a long corner exceeding 1000 feet, horizontal distance. Typically, this includes a variety of live skyline systems, including standing skylines and running skylines where reach is long.



*Short-span cable:* All cable systems with a longer corner of not more than 1000 feet, horizontal distance. Typically, this includes running skyline with a carriage and chokers, running skyline with grapple, live skyline with gravity return, and highlead.

*Running skyline:* A yarding system with three suspended moving lines, generally referred to as the main, haulback, and slack-pulling, that when properly tensioned will provide lift, travel, and control to the carriage; normally indicates a gantry type tower and a three-drum yarder.

*Shovel:* The process of forwarding logs from stump to landing by repeated swinging of logs by a hydraulic excavator-based log loader.

*Helicopter:* Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.

## **Long-Term Productivity**

Long-term productivity refers to the capability of the land and resources to continue producing goods and services for 50 years and beyond.

## **MBF**

A thousand board feet net sawlog and utility volume.

## **MMBF**

A million board feet net sawlog and utility volume.

## **Management Indicator Species (MIS)**

Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

## **Management Prescriptions**

Management practices and intensity selected and scheduled for application on a specific area (e.g., a land use designation) to attain multiple-use and other goals and objectives.

## **Management Requirement**

Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, and soil and water and diversity, to be met in accomplishing National Forest System goals and objectives (see 36 CFR 219.17).

## **Mass Movement**

The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture and does not include individual soil particles displaced as surface erosion.

## **Maritime Climate**

Weather conditions controlled by an oceanic environment characterized by small annual temperature ranges and high precipitation.

## **McGilvery (Soil Series)**

Soil series which represents the only well-drained organic soil found in the Ketchikan Area. It is composed of a thin surface layer (less than 8 inches deep) of organic material overlying bedrock. These soils are associated with cliffs and rock outcrops, and are sensitive to disturbance.

## **Memorandum of Understanding (MOU)**

A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

## **Middleground**

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also Foreground and Background.

**Mineral Soils**

Soils consisting predominately of, and having its properties determined by, mineral material.

**Minimum Viable Population**

A population with the estimated numbers and distribution of reproductive individuals to maintain the population over time.

**Mitigation**

Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

**Mixed Conifer**

In Southeast Alaska, mixed conifer stands usually consist of western hemlock, mountain hemlock, Alaska yellowcedar, Western redcedar, and Sitka spruce species. Shore pine may occasionally be present depending on individual sites.

**Model**

A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

**Monitoring**

A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

**Multiple-aged Stands**

An intermediate form of stand structure between even and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand.

**Multiple Use**

The management of all the various renewable resources of the National Forest System to be used in the combination that will best met the needs of the American people.

**Muskeg**

In Southeast Alaska, a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

**National Environmental Policy Act (NEPA) of 1969**

An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, Agricultural Handbook 453. USDA Forest Service, 359 pp.).

**National Forest Management Act (NFMA)**

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

**Native Selection**

Application by Native corporations and individuals to a portion of the USDI Bureau of Land Management for conveyance of lands withdrawn in fulfillment of Native entitlements established under ANSCA.

### **Net Sawlog Volume**

Tree or log volume suitable in size and quality to be processed into lumber. In Southeast Alaska, depending on the market, the volume may be processed as pulp or lumber.

### **No-action Alternative**

The most likely condition expected to exist in the future if current management direction were to continue unchanged.

### **Non-commercial Forest Land**

Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest Land.

### **Non-commercial species**

Species that have no economic values at this time nor anticipated timber value within the near future.

### **Non-Forest Land**

Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

### **Notice of Intent (NOI)**

A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

### **Old Growth**

Ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of forest stand development that typically differ from earlier stages in a variety of characteristics which may include larger tree size, higher composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context.

### **Organic Soils**

Soils that contain a high percentage (generally greater than 20 to 30 percent) of organic matter throughout the soil depth.

### **Parent Material**

The unconsolidated and partially-weathered material (or the C Horizon) from which upper layers of soil developed.

### **Partial Cut**

Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns. This does not include clearcutting. Can include seed tree, shelterwood, or other methods.

### **Patch**

A non-linear surface area differing in appearance from its surroundings.

### **Payments to States**

A fund consisting of approximately 25 percent of the gross annual timber receipts received by the National Forests in that State. This is returned to the State for use on roads and schools.

### **Peak Flow**

The highest discharge of water recorded over a specified period of time at a given stream location. Often thought of in terms of spring snowmelt, summer, fall, or winter rainy season flows. Also called maximum flow.

### **Planning Area**

The area of the National Forest System controlled by a decision document.

### **Planning Record**

A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

### **Plant Communities**

Aggregations of living plants having mutual relationships among themselves and to their environment. More than one individual plant community.

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### **Population Viability**

Ability of a population to sustain itself.

### **Productive Old Growth (POG)**

Old-growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

### **Public Participation**

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

### **Record of Decision**

A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

### **Reforestation**

The natural or artificial restocking of an area with trees.

### **Regeneration**

The process of establishing a new crop of trees on previously-harvested land.

### **Regional Guide**

The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended. It guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands within a given region. The Alaska Regional Guide was rescinded by the 2000 Planning Rule, and is replaced by direction in Forest Service Manual 2410, R10 Supplement 2400-2002-1.

### **Resident Fish**

Fish that are not anadromous and that reside in freshwater on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

### **Responsible Official**

The Forest Service employee who has the delegated authority to make a specific decision.

### **Restoration**

The long-term placement of land back into its natural condition or state of productivity.

### **Revegetation**

The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.

### **Riparian Area**

Area with distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems, which can be geographically delineated.

### **Riparian Ecosystem**

Land next to water where plants that are dependent on a perpetual source of water occur.

### **Roads**

*Specified:* Roads usually developed and operated for long-term land and resource management purposes to constant service.

*Temporary:* For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.



### **Roadless Area**

An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

### **Rotation**

The planned number of years between the time that a forest stand is regenerated and its next cutting at a specified stage of maturity.

### **RPA Assessment and Program**

The RPA Assessment is prepared every 10 years and describes the potential of the nation's forests and rangelands to provide a sustained flow of goods and services. The RPA Program is prepared every 5 years to chart the long-term course of Forest Service management of the National Forests, assistance to State and private landowners, and research. They are prepared in response to Sections 3 and 4 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) (16 U.S.C. 1601).

### **Sawlog**

That portion of a tree that is suitable in size and quality for the production of dimension lumber collectively known as sawtimber.

### **Scheduled Lands**

Land suitable and scheduled for timber production and which are in the land base for the calculation of the allowable sale quantity and long-term sustained yield timber capacity.

### **Scheduled Timber Harvests**

Timber harvests done as part of meeting the allowable sale quality.

### **Scrub-Shrub Wetland**

Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

### **Scoping Process**

Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to be considered in an EA or an EIS.

### **Second Growth**

Forest growth that has become established following some disturbance such as cutting, serious fire, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

### **Sediment**

Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

### **Seed Tree**

Small number of seed-bearing trees left singly or in small groups after timber harvest to provide seed for regeneration of the site.

### **Selective Cutting**

The annual or periodic removal of trees (particularly the mature), individually or in small groups from an uneven-aged forest to achieve the balance among diameter classes needed for sustained yields, and in order to realize the yield, and establish a new crop of irregular constitution. Note: The improvement of the forest is a primary consideration.

### **Sensitive Species**

Plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for

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official listing as endangered or threatened species, that are on a non-official State list, or that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists.

### **Short-term Use**

Short-term uses, and their effects, are those that occur annually or within the first 10 years of project implementation.

### **Silviculture**

The science of controlling the establishment, composition, and growth of forests.

### **Smolt**

Young silvery-colored salmon or trout which move from freshwater streams to saltwater.

### **Snag**

A standing dead tree, usually greater than 5 feet tall and 6 inches in diameter at breast height.

### **Soil Productivity**

The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

### **Spawning Area**

The available area in a stream course which is suitable for the deposition and incubation of salmon or trout eggs.

### **Split Yarding**

The process of separating the direction of timber harvest yarding into opposite directions.

### **Stand (Tree Stand)**

An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

### **Standard**

A course of action or level of attainment required by the modified 1997 Forest Plan to promote achievement of goals and objectives.

### **State Historic Preservation Officer (SHPO)**

State-appointed official who administers Federal and State programs for cultural resources.

### **Stocking**

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

### **Stream Classes**

See Aquatic Habitat Management Unit.

### **Stream Order**

First-order streams are the smallest unbranched tributaries; second-order streams are initiated by the point where two first-order streams meet; third-order streams are initiated by the point where two second-order streams meet, and so on.

### **Structural Diversity**

The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

### **Stumpage**

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

### **Subsistence**

Section 803 of the Alaska National Interest Lands Conservation Act defines subsistence use as, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of

nonedible by-products of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

### **Subsistence Use Area**

Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey (TRUCS) and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

### **Substantive Comment**

A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

### **Substrate**

The type of material in the bed (bottom) of rivers and streams.

### **Succession**

The ecological progression of community change over time, characterized by displacements of species leading towards a stable climax community.

### **Suitable**

Commercial forest land identified as having both the biological capability and availability to produce industrial wood products.

### **Suitable Forest Land**

Forest land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, and for which there is reasonable assurance that such lands can be adequately restocked, and for which there is management direction that indicated that timber production is an appropriate use of that area.

### **Suspended Sediment**

The very fine soil particles which remain in suspension in water for a considerable period of time without contact with the stream or river channel bottom.

### **Sustained Yield**

The amount of renewable resources that can be produced continuously at a given intensity of management.

### **Tentatively Suitable Forest Land**

Forest land that is producing or is capable of producing crops of industrial wood and: (a) has not been withdrawn by Congress, the Secretary of Agriculture or the Chief of the Forest Service; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within 5 years after final harvest; and (d) adequate information is available to project responses to timber management activities.

### **Thinning**

The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand or wildlife or other purposes. Thinning may be done at two different stages.

### **Threatened Species**

Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a Threatened Species. See also Endangered Species, Sensitive Species.

### **Threshold**

The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

## **Tiering**

Eliminating repetitive discussions of the same issue by incorporating by reference. The general discussion in an environmental impact statement of broader scope; e.g., this document is tiered to the Tongass Land and Resource Management Plan, as amended.

## **Timber Appraisal**

Establishing the fair market value of timber by taking the selling value minus manufacturing costs, the cost of getting logs from the stump to the manufacturer, and an allowance for profit and risk.

## **Timber Classification**

Forested land is classified under each of the land management alternatives according to how it relates to be management of the timber resource. The following are definitions of timber classifications used for this purpose.

*Nonforest:* Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

*Forest:* Land at least 10 percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

*Suitable or suitable available:* Land to be managed for timber production on a regulated basis.

*Unsuitable:* Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

*Commercial forest:* Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

## **Timber Harvest Unit**

A "Timber Harvest Unit" is a portion of a timber sale within which Forest Service specifies for harvest all or part of the timber to meet the requirements of a timber sale contract.

## **Timber Stand Improvement (TSI)**

All noncommercial intermediate cutting and other treatments to improve composition, condition, and volume growth of a timber stand.

## **Tongass Land and Resource Management Plan (Forest Plan)**

The 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

## **Turbidity**

An indicator of the amount of sediment suspended in water.

## **Unavoidable Adverse Effects**

Unavoidable adverse environmental effects are those that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of activities. The interdisciplinary procedure used to identify specific harvest units and roads is designed to eliminate or lessen significant adverse consequences. The application of Forest Plan Standards and Guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. Regardless of the use of these measures or the alternative selected, some adverse effects will occur.

## **Understory**

The trees and shrubs in a forest growing under the canopy or overstory.

## **Uneven-aged Management**

Forest management techniques which simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes.



### **Unscheduled Lands**

Lands suitable but not scheduled for timber production and which are not in the land base for the calculation of the allowable sale quantity nor long-term sustained yield timber capacity.

### **Unsuitable**

Forest land withdrawn from timber utilization by statute or administrative regulation; for example, Wilderness, or identified as not appropriate for timber production in the forest planning process.

### **Utility Logs**

Those logs that do not meet sawlog grade but are suitable for production of firm usable pulp chips.

### **Value Comparison Unit (VCU)**

Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

### **Viable Population**

The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

### **Viewshed**

An expansive landscape or panoramic vista seen from a road, marine waterway, or specific viewpoint.

### **Visual Quality Objectives (VQO)**

Measurable standards reflecting five different degrees of landscape alteration based upon a landscape's diversity of natural features and the public's concern for high scenic quality. The five categories of VQOs are:

*Preservation:* Permits ecological changes only. Applies to Wilderness areas and other special classified areas. Management activities are generally not allowed in this setting.

*Retention:* Provides for management activities that are not visually evident to the casual forest visitor.

*Partial Retention:* Management activities remain visually subordinate to the natural landscape.

*Modification:* Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally-established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

*Maximum Modification:* Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

### **V-Notches**

A deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

### **Volume**

Stand volume based on standing net board feet per acre by Scribner Rule.

### **Volume Strata**

Categories of timber volume derived from the timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

*Low Strata:* The lowest range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the low volume class strata to contain approximately 13.9 MBF/Acre.

*Medium Strata:* The middle range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the medium volume class strata to contain approximately 23.3 MBF/Acre.

*High Strata:* The high range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the high volume class strata to contain approximately 29.9 MBF/Acre.

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### **Watershed**

The area that contributes water to a drainage or stream. Portion of the forest in which all surface water drains to a common point. Watersheds can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

### **Wetland**

Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds. See the modified 1997 Forest Plan pp. 3-318 and 3-321 for detailed discussion on wetland type definitions.

### **Wilderness**

Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000 acres are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by ANILCA and TTRA.

### **Wildlife Analysis Area (WAA)**

A division of land used by the Alaska Department of Fish and Game for wildlife analysis.

### **Wildlife Habitat**

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

### **Windfirm**

Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features.

### **Windthrow**

The act of trees being uprooted by the wind. In Southeast Alaska, Sitka spruce and hemlock trees are shallow rooted and susceptible to windthrow. There generally are three types of windthrow:

*Endemic:* where individual trees are blown over;

*Catastrophic:* where a major windstorm can destroy hundreds of acres; and

*Management Related:* where the clearing of trees in an area make the adjacent standing trees vulnerable to windthrow.

### **Winter Range**

An area, usually at lower elevation, used by big game during the winter months; usually smaller and better-defined than summer ranges.

### **Yarding**

Hauling timber from the stump to a collection point.

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KMRD file photo



# **Appendix A**

## **Reasons for Scheduling the Environmental Analysis of the Licking Creek Project Area Timber Sale**



# Appendix A

## Reasons for Scheduling the Environmental Analysis of Licking Creek Project Area Timber Sale

### Introduction

This Appendix provides a detailed explanation of the rationale for a specific timber harvest project and its importance to the multi-year timber program on the Tongass National Forest. To accomplish this, the following questions are answered:

- Why is timber from the Tongass National Forest being offered for sale?
- What steps must be completed to prepare a sale for offer?
- How does the Forest Service develop expectations about the market demand for timber?
- How does the Forest Service maintain an orderly and predictable timber sale program?
- How does the Forest Service decide where timber sale projects should be located?
- How does this project fit into the Tongass timber program?
- Why can't this project be located somewhere else?

Coordinated timber sale planning is essential for meeting the goals of the Tongass Land Management Plan and to provide an orderly flow of timber to local industry. To determine the volume of timber to offer each year, the Forest Service can look to current market conditions and the level of industry operations. However, the lengthy planning process, of which this document is a part, requires the Forest Service to rely on projections of future harvest levels to decide how many timber sale projects to begin each year. This document explains how the Forest Service uses information about future markets and past experience with the logistics of timber sale planning to determine the volume of timber that needs to be started through this process each year. Using a detailed timber sale schedule that provides information about each sale as it moves through each stage of the planning process, this Appendix explains the rationale and the necessity for completing this particular timber sale project at this point in time.

# Why is Timber from the Tongass National Forest Being Offered for Sale?

## National Legislation

On a national level, the legislative record is very clear about the role of the timber program in the multiple-use mandate of the national forests. The Organic Act of 1897, 16 USC 473-481 (partially repealed in 1976) directed the agency to manage the forests in order to "improve and protect the forest ... [and] for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States" (emphasis added.) The Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. 528-531, directs the Forest Service to administer federal lands for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes."

The National Forest Management Act (NFMA) of 1976 (16 U.S.C. 472a) states that "the Secretary of Agriculture...[may sell, at not less than appraised value, trees, portions of trees, or forest products located on National Forest System Lands]." Although the heart of the Act is land management planning, the Act also sets policy direction for timber management and public participation in Forest Service decision making. Under NFMA, the Forest Service was directed to "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a sustained-yield basis" (16 U.S.C. 1611).

The NFMA directed the Forest Service to complete land management plans for all units of the National Forest System. Forest Plans are developed by an interdisciplinary team to provide for the coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. These plans allocate certain parts of national forest for certain uses.

## Alaska-Specific Legislation

Legislation unique to Alaska also directs the Forest Service to maintain a commercial timber program. The Alaska National Interest Lands Conservation Act (ANILCA; P.L. 96-487, 1980) and the Tongass Timber Reform Act (TTRA; P.L. 101-625, 1990) speak directly to the issue of Tongass timber supply. Section 705(a) of ANILCA directed the Forest Service to maintain a timber supply from the Tongass at a rate of 4.5 billion board feet per decade. To ensure that the timber target was met, Congress provided for a \$40 million annual earmark to fund pre-roading, cultural treatments and innovated logging systems.

Section 101 of TTRA repealed the timber supply mandate and fixed appropriations of ANILCA and replaced them with the following more general direction:

Sec. 705. (a), Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle.

Timber from the Tongass National Forest is being offered as part of the multiple use mission of the Forest Service as identified in public laws. Alaska-specific legislation and the Forest Plan directs the Forest Service to seek to provide timber to meet market demand subject to appropriations and balancing of forest uses.

## Tongass Forest Plan

The 1979 *Tongass National Forest Land and Resource Management Plan* was the first Forest Plan to be completed. This Forest Plan was scheduled for revision in the late 1980s. This revision incorporated new resource information and scientific studies and went through and intensive public involvement process. The Record of Decision for the revised Forest Plan (*Tongass National Forest Land and Resource Management Plan*) was issued in 1997 and modified in 1999. Subsequently, Alaska Federal Court Judge James K. Singleton vacated the 1999 Forest Plan Record of Decision in a March 30, 2001 court decision. Several amendments



have been made to the 1997 Forest Plan, primarily to modify small Old-growth Habitat Reserves as directed by the Forest Plan, Appendix K.

Alaska Federal Court Judge James K. Singleton also directed the Forest Service to supplement the 1997 Forest Plan Final EIS to further evaluate the wilderness values of Inventoried Roadless Areas and make any necessary changes to the prescribed Land Use Designations. The Record of Decision for this Supplemental Environmental Impact Statement was signed in February 2003. The No-Action alternative was selected; no lands were recommended for Wilderness designation and no changes were made to the 1997 Forest Plan Land Use Designations.

With regard to timber production, the Record of Decision for the 1997 Plan states: "The Tongass National Forest will continue timber harvest consistent with sustained yield and multiple use goals..." The maximum amount of timber that could be harvested (Allowable Sale Quantity or ASQ) during the first decade of the 1997 Forest Plan implementation is an average of 267 MMBF per year. The SEIS for the Forest Plan estimated that the ASQ would be 259 MMBF as a result to changes in land use designations, such as old-growth reserves and land ownership. A lower level is more likely to be offered over the next few years, given current market conditions and the transition that both the timber industry and the Forest Service are experiencing.

The timber resource will be managed for production of sawtimber and other wood products from timberlands available for sustainable timber harvest, on an even-flow, sustained-yield basis and in an economically efficient manner. The Tongass National Forest will seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber and the market demand for the planning cycle.

The Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple use goals. The forest-wide standards and guidelines for timber include general direction to "[e]nsure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process. However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used..."

Forest-wide, considering all land allocations where timber harvest is permitted, it is estimated that 65 percent of harvesting will involve clearcutting, with the remaining 35 percent utilizing other methods."

In the day-to-day operation of the Tongass timber program, the Forest Service attempts to strike a balance among timber availability as documented in the Forest Plan, the market demand for timber in Southeast Alaska, the needs and desires of other forest users, and funding allocations made by Congress.

The Roadless Area Conservation; Final Rule (Roadless Rule) was signed by the Secretary of Agriculture in January 2001. This rule generally established prohibitions on road construction, road reconstruction, and timber harvest in inventoried roadless areas on National Forest System lands. The rule prohibits logging and road building on nearly 60 million acres of lands, 9.3 million acres of which are within the Tongass National Forest. The Licking Creek project area does not propose harvest or roadbuilding within inventoried roadless areas as identified by the Roadless Rule.

Currently the Roadless Area Conservation Rule (Roadless Rule, January 12, 2001) is in effect and is the subject of a number of lawsuits. The Department of Agriculture and the Department of Justice have entered into an agreement with the State of Alaska (signed 6/10/03) settling the state's lawsuit challenging the applicability of the roadless rule in Alaska. The Department of Agriculture committed to publishing for comment a proposed amendment to the Roadless Rule that excludes the Tongass National Forest. Publication of this proposed amendment is scheduled for the summer 2003 and includes a public comment period. The Department has

made no representation regarding the content or substance of any final amendment to the Roadless Rule that may result.

The analysis for the Licking Creek Timber Sale was completed to comply with the direction in the 1997 Tongass Land and Resource Management Plan (Forest Plan). The effects were estimated as if the maximum timber harvesting allowed under the Forest Plan will occur over the next decade and into the future because this is the maximum amount of environmental impacts that could be reasonably foreseen. It is likely that the impacts will be less, given that much less timber has been harvested in the first 5 years of implementation than what was projected to occur in the Forest Plan, and pending the outcome of the Roadless Rule settlement. An analysis to the effects to Inventoried Roadless Areas has been included for this project.

## What Steps Must Be Completed to Prepare a Sale for Offer?

The timber sale program is complex. A number of projects are underway at any given point in time, each of which may be in a different stage of planning and preparation. A system of checkpoints, or "gates" (FSH 2409.18), helps the Forest Service track the accomplishments of each stage of a project from inception to contract termination.

### **Gate 1 - Completion of Position Statement**

The Position Statement is a brief analysis of the project area with the intent of determining the feasibility of the potential timber sale. This is the first step in the timber sale planning process and it is usually completed from 7 to 10 years before a sale is offered. After the Position Statement is developed, the Forest Service decides whether to continue to the next phase of the project where a significant investment in time and money will be made.

### **Gate 2 – Sale Area Design, Environmental Documentation, and Decision**

This phase of the project is commonly referred to as the "NEPA" phase and includes inventory, public scoping, analysis, draft disclosure of the effects of the project on the environment, public comment, final analysis and disclosure, decision, potential appeal, and litigation. Gate 2 activities are generally completed 2 to 6 years before a sale is offered. The end product of this phase, an environmental decision document, forms the starting point for the next phase.

### **Gate 3 – Plan Implementation and Field Layout**

During this phase, the information and direction included in the decision document (Gate 2) is used to designate the actual project on the ground. Additional site-specific information is collected at this time. Gate 3 activities are typically completed 1 to 3 years before a sale is offered.

### **Gate 4 – Appraisal Offering Package**

The costs and value associated with the timber sale designed in Gate 3 are computed and packaged in a timber sale contract. The contract tells the prospective timber sale purchaser how the sale must be harvested to be in conformance to the project decision document. This phase of the Gate system occurs during the final year of the project development and culminates with the advertisement of the project for sale.

### **Gate 5 – Bid Opening**

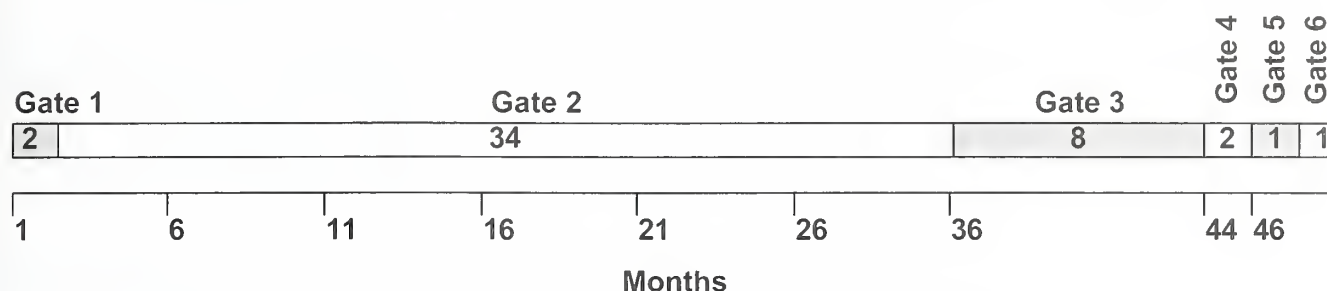
Gate 5 is completed with the opening of bids for the project. If a bid is submitted, contractual provisions govern when the award of the sale takes place and when the sale will be completed and how timber removal is to occur.

### **Gate 6 - Award**

Gate 6 is the formal designation of a contract between a bidder and the Forest Service.

Figure A-1  
Average Timeline for the Gate System

**Average Timeline for the Gate System through Award \***



Gate 1 – Completion of Position Statement

Gate 2 – Sale Area Design, Environmental Documentation and Decision

Gate 3 – Plan Implementation and Field Layout

Gate 4 – Appraisal Offering Package

Gate 5 – Bid Opening

Gate 6 – Award

\* After a sale is awarded, it is under contract from 1 to 3 years depending on size.

\* Source: Alaska Regional Office unpublished data, Average time for timber harvest EIS document. (R10 2002 Planning Workshop)

## How does the Forest Service Develop Expectations about Future Timber Markets?

The Tongass National Forest makes two determinations on volume to be offered. The first is a determination on volume to be offered for the current year (annual market demand). The annual market demand is analogous to assessing industry performance in the short-term. In the short run, a firm will make use of its existing equipment to maximize profits or minimize losses. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. Timber inventory requirements are acknowledged and estimated in a related calculation. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year. The document titled *Evaluating the Demand for Tongass Timber* (Morse 1998) forms the basis for how these estimates were developed. The document titled *Tongass National Forest Timber Sale Procedures* (Morse 2000a) documents actual estimates for the current year. This estimate is what the Tongass plans to offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so. Final procedures can be located in the document titled: *Responding to the Market Demand for Tongass Timber* (Morse 2000).

Based on the analysis documented in the *Timber Sale Procedures* for Fiscal Year 2003, the Tongass National Forest must offer 151 MMBF to meet timber supply objectives. The offer planned will be a combination of new, previously offered, or previously offered and reconfigured timber sales. Both standing timber and salvage will be components of the program. Offerings will consist of those targeted for Small Business qualified firms as well as a portion of the volume being made available for the open market.



## Appendix A

### Life of the Forest Plan (Market Demand over the Planning Cycle)

Given the lengthy process of preparing a timber sale, the proposed timber sales in this document may not be harvested for 3 to 4 years or longer, not including appeals or litigation. For planning purposes, the Forest Service needs some idea of what the long-term timber demand will be, given the cycles in the market. The Pacific Northwest Research Station was asked for professional assistance in assessing the long-term timber demand.

As the Tongass Land and Resource Management Plan was being revised in 1997, research economists at the Pacific Northwest Research Station (PNW) were asked to update their earlier projections of Alaska timber products output and timber harvest by ownership. The most recent projections of timber harvest over the planning cycle account for several dramatic changes in the region's manufacturing capabilities, increased competition from a number of sources, and the steady erosion of North America's share of Japanese timber markets.

The Forest Service documents these projections and the means of implementation through the issuance of a Ten Year Timber Sale Schedule. Each year this plan is updated whereby the current year is dropped at the culmination of the fiscal year and a new year ten is added. The basis for this schedule is long-range timber market projections documented in the publication titled *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes 1997). These projections of Alaska timber products output, the derived demand for raw material, and timber harvest by owner are developed from a trend-based analysis. These projections reflect the consequences of recent changes in the Alaska forest sector and long-term trends in markets for Alaska products. With the closure of the two Southeast Alaska pulp mills, demand for Alaska National Forest timber now depends on markets for sawn wood and the ability to export manufacturing residues and lower grade logs. Three alternative projections are used to display a range of possible future demand (Table A-1). Areas of uncertainty include the prospect of continuing changes in markets and in conditions faced by competitors and the speed and magnitude in investment in manufacturing in Alaska.

Demand projections are important for program planning. They provide guidance to the Forest Service for requesting budgets, for making decisions about workforce and facilities, and for indicating the need to begin new NEPA analysis for future program offerings. They also provide a basis for expectations regarding future harvest, and thus provide an important source of information for establishing the schedule of probable future sale offerings. The weight given to the projections will vary depending on a number of factors, such as how recently they were done, and how well they appear to have accounted for recent, site-specific events in the timber market.



Table A-1  
Projected National Forest Harvest<sup>1</sup>

Fiscal Year	Projected Harvest (MMBF)			Actual
	Low	Medium	High	
1998	77.3	86.0	112.2	119.8
1999	86.4	99.3	127.9	145.8
2000	95.5	115.9	142.7	146.8
2001	104.6	129.0	157.7	47.8 <sup>2</sup>
2002	113.7	134.9	173.1	33.8 <sup>3</sup>
2003	122.8	140.8	188.9	
2004	131.9	146.5	205.0	
2005	131.9	152.2	221.4	
2006	131.9	157.8	238.2	
2007	132.0	163.4	255.3	
<b>Average</b>	112.8	132.6	182.2	98.8

<sup>1</sup> Table 1 from *Responding to Market Demand for Tongass Timber*, Morse, April 2000, R10-MB-413. This schedule is based on the projections documented in *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes 1997), and current volumes in the timber sale pipeline process. For Fiscal Years 2003-2009, the Tongass National Forest plans to schedule approximately 152 MMBF for sale each year over the life of the Forest Plan. Prior to the beginning of each fiscal year the amount of volume to be scheduled in that fiscal year is once again analyzed to determine if the projection meets the anticipated need.

<sup>2</sup> Truncated logging season due to Judge James K. Singleton's Forest Plan Appeal Decision, March 30, 2001.

<sup>3</sup> Tongass volume harvested as of September 30, 2002.

## How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?

### Pools of Timber (Pipeline Volume)

As discussed earlier, the Forest Service tracks accomplishment of various stages of development of each timber sale with the Gate System process. From a timber sale program standpoint, it is also necessary to track and manage multiple projects through time as projects collectively move through the Gate System. Tracking of the multiple projects can be likened to following various segments of several projects through a pipeline of time. Because of the timeframes needed to accomplish a given timber sale and the complexities inherent in timber sale project and program development, it is necessary to track various timber sale program volumes from Gate 1 through Gate 6. Gate 1 volume represents a large pool of program volume, but represents a relatively low investment from project to project. This relative investment level offers the timber program manager a higher degree of flexibility and thus, does not greatly influence the flow of volume through the pipeline. In addition, tracking of how much volume near the end of the pipeline that is in appeals or litigation may be necessary to determine potential effects on the flow of potential timber sales.

The goal of the Tongass National Forest is to provide an even flow of timber sale offerings on a sustained yield basis. In past years, this has been difficult to accomplish due to continual reductions in the suitable timberland base, reductions in the timber industry processing capabilities, rapid market fluctuations and Forest Plan modifications and litigation. To achieve

an even flow of timber sale offerings, 'pools' of projects in various stages of the Gate System will be maintained so volume offered can be balanced against current year demand and market cycle projections (*Declaration of Frederick L. Norbury, 1994*).

Today, upward trends in demand are reacted to by moving outyear timber projects forward leaving outyears not capable of meeting the needs of the industry. In other instances, a number of new projects are started based on today's market but not available for a number of years. By the time the added projects are ready for offer, the market and demand for this volume has changed. Three pools are being tracked to achieve an even flow of timber sale offerings:

- **Pool 1, Timber volume under analysis (Gate 2):** Timber volume under analysis contains sales being analyzed and undergoing public comment through the NEPA process. This process can often take from 1 to 5 years and ends with a NEPA decision. This pool includes any project with a formal Notice of Intent through those with a decision document issued. Volume in appeals and litigation will be tracked as a subset of this pool as necessary.
- **Pool 2, Timber volume available for sale (Gate 3, Gate 4 and Gate 5):** Timber volume available for sale contains sales for which environmental analysis has been completed, and administrative appeals, and litigation (if any) have been resolved. These sales have been fully prepared and appraised, and are available to managers to schedule for sale offerings. Managers need to maintain enough volume in this pool to be able to schedule future sale offerings in an orderly manner of the size and configuration that best meets the need of the public. As a matter of policy, and sound business practice, the Forest Service attempts to announce probable future sale offerings at least 1 year in advance. This allows potential purchasers an opportunity to do their own evaluations of these offerings in order to determine whether to bid, and if so, at what level.
- **Pool 3, Timber volume under contract (Gate 6):** Timber volume under contract contains sales that have been sold and a contract awarded to a purchaser, but has not yet been fully harvested. Timber contracts typically, but not always, give the purchaser 3 years to harvest and remove the timber purchased. Long-standing Forest Service practice is to attempt to maintain about 2 to 3 years of unharvested timber volume under contract to timber purchasers. This volume of timber is the industry's dependable timber supply, which allows immediate flexibility in business decisions. This practice is not limited to the Alaska Region, but is particularly pertinent to Alaska because of the nature of the land base. The relative absence of roads, the island geography, the steep terrain, and the consequent isolation of much of the timber land means that timber purchasers need longer-than-average lead times to plan operations, stage equipment, set up camps, and construct roads prior to beginning harvest.

A combination of actual harvest and projected demand drives the various timber sale program pipeline pool volume. As purchasers harvest timber, they deplete the volume under contract. Managers track harvest, and offer sales that give the industry as a whole the opportunity to replace this volume and build or maintain their working inventory. Although there can be variation for practical reasons from year to year, in the long-run, over both the high points and low points of the market cycle, timber harvest will equal timber sales.

The Forest Service, based on historical patterns, determines the amount of pipeline volume in each of the pools. Table A-2 displays volume levels that are expected to be maintained in each pool.

- Pool 1, Timber Volume Under Analysis, is expected to be maintained at approximately 4.5 times the amount of anticipated harvest.
- Pool 2, Timber Volume Available for Sale, is expected to be maintained at approximately 1.3 times the amount of anticipated harvest.

- Pool 3, Volume Under Contract, is expected to be maintained at approximately 3 times the amount of anticipated harvest.

The objective of the pools concept is to maintain sufficient volume in preparation and under contract to be able to respond to yearly fluctuations in a timely manner.

Table A-2  
Pipeline Pool Matrix

Pipeline Pool Volume	Products	End of FY 02	Planned During FY 03	End of FY 03
1. Volume Under Analysis <sup>1</sup> (Gate 2) (MMBF) (4.5 times expected harvest)		413 <sup>2</sup>	562 <sup>3</sup>	293 <sup>3</sup>
2. Volume Available for Sale <sup>4</sup> (Gate 3, Gate 4 and Gate 5) (MMBF) (1.3 times expected harvest)	NEPA Cleared	108 <sup>3</sup>	319 <sup>3</sup>	276 <sup>3</sup>
	Offered		151 <sup>5</sup>	
	Sold		123 <sup>5</sup>	
3. Volume Under Contract <sup>6</sup> (Gate 6) (MMBF) (3.0 times expected harvest)		157 <sup>7</sup>		369 <sup>8</sup>
	Volume Harvested*		123 <sup>9</sup>	

Crosswalk between Gate Tracking System (FSH 2409.18) and the concept of Pools of Timber

<sup>1</sup> Gate 2: Decision document that is viable for sale after completion of appeals and litigation.

<sup>2</sup> Actual figure from Tongass National Forest Schedule of Proposed Actions.

<sup>3</sup> Estimated figure.

<sup>4</sup> NEPA cleared timber volume: Gate 3, field preparation work; Gate 4, timber sale contract package preparation; Gate 5, Timber Sale bid opening.

<sup>5</sup> Tongass National Forest Timber Sale Procedures, (Morse 2000a), Table page 4, updated August 2003 by William Wilson, Regional Office, Forest Management Planning Group Leader.

<sup>6</sup> Gate 6: Timber sale award and contract execution, based on the Timber Sale Statement of Accounts.

<sup>7</sup> Volume under contract as of September 30 2002. Assumes GFP Sawmill (72MMBF) removed from capacity estimate. Sales not available due to Judge Singleton's injunction removed from VUC (65MMBF).

<sup>8</sup> Three times the amount of volume projected in the LOW market scenario given in Timber Output and Timber Harvests in Alaska: Projection for 1997–2010 (Brooks and Haynes 1997).

<sup>9</sup> Projected harvest for FY 2003, from the PNW Research Station using the LOW market scenario (see #8 above).

\*Note-The amount of volume estimated to be harvested for the year sets the basis for what will be maintained in Pools 1-3 (Gates 2 through 6). Should this estimate be incorrect, adjustments can be made in the following years without significant departures in outyear program capabilities.

Table A-3  
Timber Volume in Appeals and/or Litigation

Timber volume remanded on appeals and/or enjoined in litigation *	45.9 Million Board Feet
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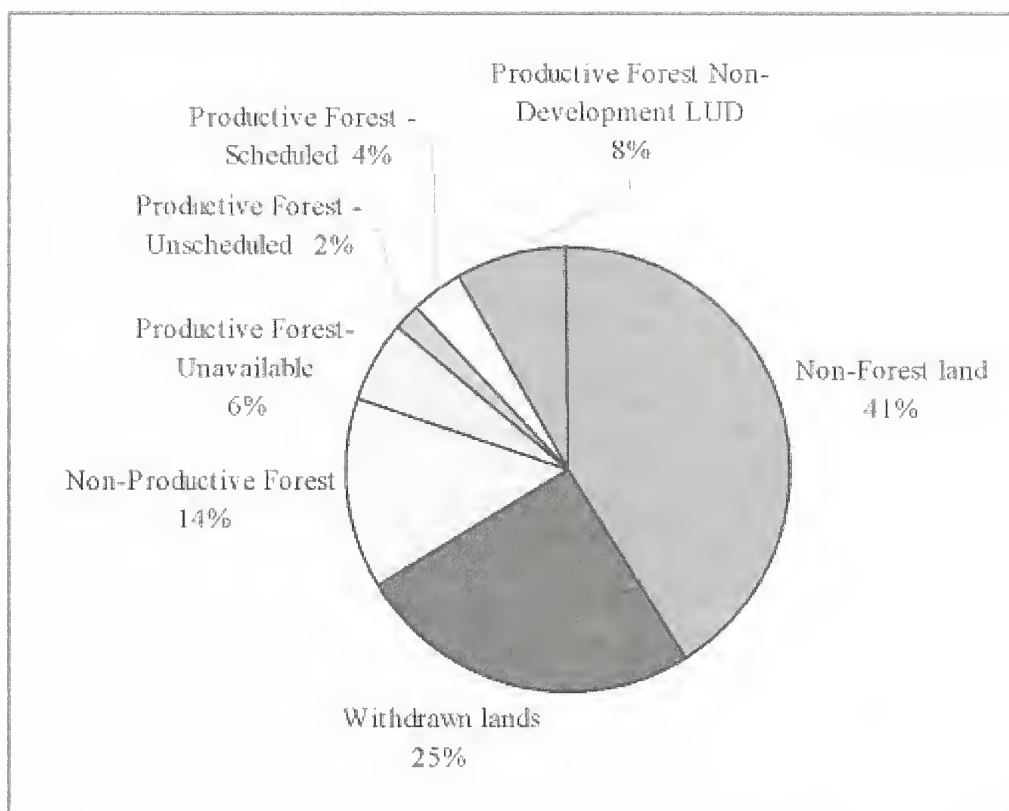
\*As of June 30, 2003. This figure does not include those environmental documents delayed due to Judge Singleton's March 30, 2001 court ruling or the Roadless Area Conservation Rule.



## How Does the Forest Service Decide Where Timber Sale Projects Should be Located?

The chart below depicts the classification of all the lands within the Tongass National Forest. Four percent of the Tongass land base, the productive suitable and available forest land, provides the land base for the Allowable Sale Quantity of 267 MMBF per year. The remainder of the land, approximately ninety-six percent, does not allow, is not scheduled, or will not support timber harvest activities. Based on Forest Plan, Appendix A.

Chart A-2  
1997 Forest Plan Timber Resource Suitability Analysis



Non-Forest land – Land that has never supported forests, e.g. muskeg, rock, ice, etc.

Withdrawn Lands – Lands designated by Congress, the Sec. of Agriculture, or Chief for purposes that preclude timber harvest are classified, e.g. Wilderness Areas

Non-productive Forest – Forest land not capable of producing commercial wood on a sustained yield basis

Productive, Non-development LUD – Productive forest lands that where timber production is not allowed due to Forest Plan land use designation e.g. Semi-Remote Recreation, Old-growth Habitat, etc.

Productive Forest Unsuitable – Forest land unsuitable for timber due to physical attributes (steep slopes) and/or inadequate information to insure restocking trees (soils).

Productive Forest Scheduled – Forest land scheduled over the rotation available for timber harvest.

Productive Forest Unscheduled – Forest land that meets all the criteria for timber production availability but not scheduled for harvest over the rotation.

## Allowable Sale Quantity (ASQ)

The 1997 Forest Plan Record of Decision established an Allowable Sale Quantity (ASQ) for timber at 2.67 billion board feet per decade, which equates to an annual average of 267 million board feet (MMBF) per year. The ASQ serves as an upper limit on the amount of timber that may be offered for sale each year as part of the regularly scheduled timber sale program. It consists of two separate Non-Interchangeable Components (NICs) called NIC I and NIC II. The NIC I component includes lands that can be harvested with normal logging systems including helicopter logging with less than ¼ mile yarding distance. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. Most of these NIC II lands are presently considered economically and technically marginal.

There are two purposes of partitioning the ASQ into two components:

- to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground and
- to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions.

## District-Level Planning

The Tongass National Forest is broken into ten ranger districts. For planning and scheduling purposes, the allowable sale quantity is distributed by ranger district. Each district has been allocated a portion of the timber harvest program based on the FORPLAN computer run and availability of suitable and available acres, to implement the Forest Plan, and Section 101 of the Tongass Timber Reform Act (1990). The distribution of the Forest Plan ASQ harvest among the Ranger Districts is displayed in Table A-4a (all volumes are identified as sawlog plus utility). The calculated demand for FY 03 is displayed in Table 4b. No NIC II volume was planned for the first decade by the Forest Plan.

**Table A-4**  
**Distribution of Forest Plan ASQ Among the Tongass National Forest Ranger Districts**

Tongass National Forest Ranger District	Non-Interchangeable Components	
	NIC I	NIC II
Ketchikan	32	7
Thorne Bay	42	9
Craig	33	7
Wrangell	28	6
Petersburg	50	9
Sitka	17	4
Hoonah	7	2
Juneau	7	2
Yakutat	4	1
Admiralty	0	0
<b>NIC Totals</b>	<b>220</b>	<b>47</b>
<b>ASQ Total (mmbf)</b>	<b>267</b>	

Table A-4b  
Distribution of current demand level for the Tongass National Forest Ranger Districts

Tongass National Forest Ranger District	Non-Interchangeable Components	
	NIC I	NIC II
Ketchikan	23	0
Thorne Bay	30	0
Craig	23	0
Wrangell	20	0
Petersburg	35	0
Sitka	12	0
Hoonah	5	0
Juneau	5	0
Yakutat	2	0
Admiralty	0	0
<b>NIC Totals</b>	<b>155</b>	<b>0</b>
<b>ASQ Total (mmbf)</b>	<b>155</b>	

The Forest Supervisor for the Tongass National Forest has discrete responsibilities for the overall management of the Forest's timber sale program. Included within these responsibilities is making the determination on the amount of timber volume to be made available to industry, as described above. Once a determination is made for the current year (annual demand) offer level, the information is presented to Congress via the Regional Forester and Chief of the Forest Service. Whether or not funding is appropriated to attain the program is the responsibility of the Congress and the President of the United States.

While the debate on funding takes place, the Tongass Forest Supervisor directs the District Rangers to formulate timber sale schedules that attain the prescribed offer level for the current year as well as develop outyear timber programs based on projected market demand for the planning cycle. District Rangers are also directed to prioritize efforts in areas that are economical as possible and are not subject to pending legislation and litigation. The Ranger's role is to recommend to the Forest Supervisor timber harvest projects that meet Forest Plan goals and objectives. Districts work on various projects simultaneously resulting in continual movement of projects through the stages of the timber program pipeline. Their schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. Once all of the Rangers' recommendations are made and compiled into a consolidated schedule, the Forest Supervisor is responsible for the review and approval of the final plan.

Pending Congressional appropriations, the sale schedule is implemented. In the event insufficient funds or resolution to pending litigation or legislation serve to delay the planned schedule, timber sale projects are selected and implemented on a priority basis. Generally, the higher priority projects include sales where investments such as road networks, camps or log transfer facilities have already been established or where land management status is not under dispute. Those sales that are not implemented or only partially implemented are moved to the outyear. The sale schedule becomes very dynamic in nature due to the number of influences on each of the districts. A formal review of the schedule is done annually by the Forest Supervisor in consultation with the District Rangers, and amendments are made as needed through the

course of the year. (The Tongass Timber Sale Plan is located on the Tongass National Forest Website, [www.fs.fed.us/r10/tongass/](http://www.fs.fed.us/r10/tongass/)).

The National Forest Management Act requires the Forest Service to develop timber sale schedules that encompass the life of the Forest Plan. The Tongass National Forest Planning process culminated in issuance of the *Forest Plan Record of Decision for the Tongass Land and Resource Management Plan*. In response to this Plan, the Tongass has prepared a Ten Year Timber Sale Schedule for Fiscal Years 2002-2012. The Ten Year Timber Sale Plan for Fiscal Year 2003 offer level is based to the extent possible on annual market demand estimates. Planning delays attributable to resolution of the Roadless Rule and court-ordered injunctions have affected this offer level in recent years. The remaining years, 2004-2012, are based on market demand projections over the planning cycle. Table A-5 denotes the first year of the Ten Year plan. The Ten Year Timber Sale - Fiscal Year 2003 is listed below to show the reader an example of the information available and display the timber sales scheduled for the current fiscal year.



Table A-5  
Tongass Ten Year Timber Sale Plan-Fiscal Year 2003

NEPA Project	Decision		Sale Name	Vol S+U		FY03 Gate	FY03 Gate
	Date	RD		(MMBF)	Class	3	5
Licking Creek	*	KMRD	Licking Creek	16.8	S	12.0	12.0
Licking Creek	*	KMRD	Licking Creek South	4.8	S	4.8	4.8
Boundary (H.L.)	*	KMRD	Boundary	3.0	S	3.0	3.0
Mop Pt/91 Knot	Jun 01	KMRD	91-Knot Reoffer	0.5	S	0.5	0.5
Cholmondeley	Apr 03	CRD	Dr. Point	16.0	S	16.0	16.0
Cholmondeley	*	CRD	Skowl	7.0	S	7.0	7.0
Craig Small Sales	*	CRD	Various Small Sales	0.5	S	0.5	0.5
Cholmondeley	Apr 03	CRD	Sunny (FY99 Sale)	7.0	S	7.0	7.0
Cholmondeley	Apr 03	CRD	Cher (FY99 Sale)	5.0	S	5.0	5.0
Chasina EIS	Apr 98	CRD	Johnston Mtn. (FY01 Sale)	5.9	S	0.5	5.9
TNB Small Sales EA	*	TNB	Various Small Sales	3.0	S	3.0	3.0
Roadside EA	May 03	TNB	Small Sales	2.0	S	2.0	2.0
Roadside EA	May 03	TNB	Small Sales	2.0	S	2.0	2.0
Lab Bay EIS	Jan 97	TNB	Thorne Island	3.5	S	0.5	3.5
Luck Lake	Jun 00	TNB	Luck Lake (FY 00)		O		8.0
Control Lake EIS	May 98	TNB	Mad Rush (FY 01)		O		5.3
Heceta Second Growth	*	TNB	Heceta CT	8.0	S	8.0	8.0
Couverden	*	JRD	Homeshore	25.0	S	15.0	15.0
HRD Small Sales	*	HRD	Small Sales	0.4	S	0.4	0.4
Yakutat Salvage EA	Apr 03	YRD	Yakutat Salvage	10.0	S	10.0	10.0
Scott Peak EIS	*	PRD	Sherman Peak	12.0	S	8.0	8.0
Woodpecker	Dec 02	PRD	Woodbine (Unit 187)		S	0.1	0.1
Woodpecker	Dec 02	PRD	Woodchuck (Unit 161A)		S	0.2	0.2
Twin Creek EA	Aug 98	PRD	Frenchy 99		S		1.0
South Lindenberg	Dec 96	PRD	Redo		S	5.0	5.0
Threemile	*	PRD	Threemile	20.0	S	20.0	20.0
South Lindenberg	Dec 96	PRD	Short Run		S	1.0	1.0
Doughnut EA	Apr 00	WRD	Doughnut		S		3.4
Skipping Cow	Apr 00	WRD	Skipping Cow Reoffer		S		31.0

\* These NEPA documents are in -progress and may or may not have an action alternative selected and may or may not be completed this year due to delays due to legislation or litigation. Volumes displayed are for planning purposes only and do not constitute a decision.

The Ten Year Schedule provides a significant amount of information and is described as follows:

**NEPA Project:** Environmental document project name. This name may or may not differ from the timber sale project name depending on how many sales originate from the original NEPA document.

**Decision Date:** The date of the decision document, whether planned or actual. “\*” denotes project has started and completion was planned within the Fiscal Year but there is no decision at this time.

**RD:** Ranger district office where project is located (PRD=Petersburg Ranger District).

**Sale Name:** Timber sale project name. FY 99, FY 00 or FY 01 designates that this timber sale was originally planned to be sold in a previous year, but delayed due to postponed NEPA decisions, appeals, or lack of personnel due to the fire season. The timber sale may also have been advertised but was not sold and the sale is now planned to be reoffered.

**Vol S+U (MMBF):** Timber sale project volume (sawlog plus utility).

**Class:** Timber sale size class determination (S=Small Business Administration, O=open sale to all bidders).

**FY03 Gate 3 (Layout):** Only appears in fiscal year sale is to be laid out and appraised.

**FY03 Gate 5 (Offer):** Only appears in fiscal year sale is to be offered. Number designates potential volume.

The location of timber sale projects is based on the land allocation directed in the Forest Plan decision. The Forest Plan allows timber sales in areas identified as Timber Production, Modified Landscape, and Scenic Viewshed land use designations.

The District Ranger is responsible for identifying and recommending the project areas for the Ten Year Timber Sale Schedule. The considerations the Ranger makes on each project include but are not limited to the following:

- The project area contains a sufficient number of acres allocated to development land use designations to make timber harvest in the area appropriate under the Forest Plan. There is an adequate amount of suitable and available land for timber harvest opportunities. Available information indicates harvest of the amount of timber volume being considered for this project can occur consistent with the Forest Plan Standards and Guidelines, other resource protection requirements and human needs such as subsistence.
- The project and proposed timber harvest volume can contribute to achieving the goals and objectives of implementing the Forest Plan.
- The potential investment in infrastructure (roads, bridges, log transfer facilities, camps, rock pits, etc.) necessary for sustainable timber harvest offerings is achievable with the project and estimated value of timber. Where infrastructure already exists, this project will enable any maintenance and upgrade of the facilities necessary for removal of timber volume.
- Based on current year and anticipated outyear timber volume demand, volume currently under contract; anticipated Congressional allocations, and the availability of resources to fully prepare and offer this project for sale, this project is consistent with and meets all laws and regulations governing the removal of timber from National Forest System lands, Forest Service policies as described in the manuals and handbooks, and the 1997 Tongass Land and Resource Management Plan FEIS and ROD.

## How Does This Project Fit into the Tongass Timber Program?

The Licking Creek Timber Sale project is proposed for offer beginning in Fiscal Year 2003. (Tongass National Forest Ten Year Timber Sale Schedule, approved by Thomas Puchlerz,

Forest Supervisor, September 30, 2002). The Licking Creek Timber Sale project will be scheduled as soon as planning can be completed. The Licking Creek Timber Sale project is currently in Gate 2, "Volume Under Analysis." The project's action alternatives being addressed in the NEPA analysis range from approximately 5.4 MMBF to 16.8 MMBF that could contribute to the Tongass Timber Sale Program. As described earlier, the volume of timber needed to maintain this Pool is 562 MMBF. Currently, forest-wide, Pool 1 contains from 162.6 MMBF to 187.4 MMBF inclusive of this project. Therefore, the Licking Creek Timber Sale project is consistent with program planning objectives and necessary to meet the goal of providing an orderly flow of timber from the Tongass on a sustained yield basis. Given the included information, it is reasonable to be conducting the environmental analysis for this project at this time.

## Why Can't This Project Occur Somewhere Else?

As previously discussed, the market demand for timber for the 10 years after the Forest Plan was signed is expected to average 168 MMBF per year. The suitable and available land base on the Tongass National Forest is capable of supporting an Allowable Sale Quantity of 267 MMBF annually, 220 MMBF of which is considered economical (i.e. the NIC I component) under the usual markets. Based on the projected market demand for the planning cycle, all suitable timberlands will eventually be scheduled for harvest to meet the current and projected demand for raw material in Southeast Alaska. The relocation of this project to another area is inefficient and potentially contrary to the standards and guidelines of the Forest Plan. This decision is based on the cumulative impact on other resources from past harvest activities, the location of timber sales under contract, and the eventual use of all suitable lands for timber sale projects.

The reasons this area is being considered include:

- Areas with available timber will be necessary to consider for harvest in order to seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).
- The potential effects on subsistence resources are projected to differ little based on the sequence these areas are harvested. Harvesting other areas with available timber on the Tongass National Forest is expected to have similar potential effects on resources, including those used for subsistence, because of widespread distribution of subsistence use and other factors. Harvest within other areas is foreseeable under the Forest Plan.
- Providing substantially less timber volume than required to meet Forest Plan and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the project area is not necessary or reasonable.
- It is reasonable to schedule harvest in the project area rather than in other areas at the present time based on access and the roaded nature of the area, level of controversy over subsistence and other effects, the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet the needs of dependent industries. Other areas that are reasonable to consider for harvest in the near future are the subjects of other project EISs that are currently ongoing or scheduled to begin soon.





Calamity Creek; photo by Ricardo Sainz



# **Appendix B**

## **Response to Comments**



# Appendix B

## Response to Comments

### Introduction

Appendix B includes all written comments received for the Licking Creek Draft Environmental Impact Statement (EIS) and the U.S. Forest Service responses to them.

#### Analysis and Incorporation of Public Comment

Twelve agencies, organizations, and individuals submitted written comments on the Licking Creek Draft EIS. These comments are included in this appendix. Many comments ask for clarification or additional information to be presented in the Final EIS. Some comments may present additional information not previously considered, or request modification to an alternative, or a new alternative altogether. Some comments disagreed with direction in the Forest Plan, which makes them beyond the scope of this document. Other comments can be addressed through Forest Plan direction. Some comments involve issues beyond the analysis area or speculation that does not involve reasonably foreseeable future projects, and thus are also beyond the scope.

The Interdisciplinary Team (IDT) thoroughly and objectively read and analyzed every substantive issue or concern. Individual comments/issues within each letter, and the corresponding Forest Service response, are numbered to facilitate analysis and response.

#### Letters Received from Individuals, Organizations, and Agencies

The following list includes all individuals, organizations, and agencies that the U.S. Forest Service received substantive comments from during the 45-day comment period following the publication of the Licking Creek Draft Environmental Impact. This document includes the U.S. Forest Service response to the issues addressed in the public comment.

Name	Organization	Abbreviation	City	State	Page
Owen Graham	Alaska Forest Association	AFA	Ketchikan	AK	B-2
Sandy Harbanuk	State of Alaska Division of Governmental Coordination	DGC	Juneau	AK	B-13
Kevin Hanley	State of Alaska Dept. of Environmental Conservation	DEC	Juneau	AK	B-16
Jack Gustafson	State of Alaska Dept. of Fish and Game	ADFG	Ketchikan	AK	B-25
Brian Brown	Alcan Forest Products	Alcan	Ketchikan	AK	B-41
Arne Pihl		Pihl	Ketchikan	AK	B-43
Corrie Bosman, Page Else, Kate Taylor	Center for Biological Diversity/Sitka Conservation Society/Wilderness Society	CBD	Sitka	AK	B-45
Emily Ferry	Southeast Alaska Conservation Council	SEACC	Juneau	AK	B-79
Judith Leckrone Lee	U.S. Environmental Protection Agency	EPA	Seattle	WA	B-90
Dick Coose	Concerned Alaskans for Resources and Environment	CARE	Ketchikan	AK	B-98
Roy Eckert	Ketchikan Gateway Borough	KGB	Ketchikan	AK	B-100
Hank Hays		Hays	Ketchikan	AK	B-104
Pamela Bergmann	U.S. Dept. of Interior	USDI	Anchorage	AK	B-106
James W. Balsiger	National Marine Fisheries Service	NMFS	Juneau	AK	B-108

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## Alaska Forest Association, Inc.



111 STEDMAN STREET, SUITE 200  
 KETCHIKAN, ALASKA 99901-6599  
 Phone 907-225-6114  
 FAX 907-225-5920  
 Web Site [www.akforest.org](http://www.akforest.org)

January 20, 2003

Jerry Ingersoll, District Ranger  
 Attn: Licking Creek  
 3031 Tongass Ave.  
 Ketchikan, AK 99901

Dear Jerry,

Thank you for the opportunity to comment on the Licking Creek EIS. I have appraised several past timber sales in this area and I logged a timber sale there as well so I am already familiar with much of the area. I spoke to a woman who lived on a float camp in Carroll Inlet when the initial logging took place in this area. She told many interesting tales about her experiences there. She has not been back since, but she hopes that someday she will be able to drive from Ketchikan to this and other locations on Revilla Island. Meanwhile, I have told her that the second-growth timber is thriving and the fish and wildlife are alive and well despite the fact that the past logging did not utilize the ridiculous "alternatives-to-clearcuts" or other foolish practices.

I read the draft EIS cover-to-cover and, although I have a number of critical comments, I think this is the best-written EIS I have seen so far. The sections on economics and community impacts are much more thorough and indicate that a lot of thought was put into those sections. My comments follow in an outline format to save time typing and reading:

1. Page S-3: The cumulative effects of harvest will not "reduce" deer and wolf habitat. It will change some of the habitat. The change will increase deer browse for many years and, depending on whether or not active management is followed, the improved browse may continue indefinitely or it may be reduced for a period of time. Other plant and wildlife species benefit from the change in habitat as well. I'm sure your biologists can do an excellent job of outlining the benefits if you encourage them to do so. Please don't focus the EIS solely on hypothetical negative impacts.
2. Page S-3: Recreation is not listed in the summary although it is covered in detail later on in the EIS. I enjoy mountain biking in areas like this one and I would like to be able to make day trips to the site. A road access would be

AFA-1

AFA-2



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appreciated. Also a safe place to tie a boat for a day or two would be appreciated. Perhaps the facility that is there now is available for public use?

3. Page S-5;

- a. Please do your analysis in MBF. I used CCP for years in Washington State, but here in Alaska MBF is the norm. Don't help the bureaucrats force us to comply with their every little conforming rule. Each area of the country is unique and there is not one idea or rule or tool that will work best everywhere.
- b. Please don't list the wildlife impacts as "reductions". This is misleading and incorrect as I explained in #1.
- c. An appraisal using current Forest Service data and the species mix and costs identified in this EIS indicate that the EIS as a whole will be about \$95 deficit.

AFA-3

- i. In order to lower the cost of harvesting the timber, we recommend that you not require individual trees be left scattered around the cable logging units. If trees must be left in the units, they should be left along the boundaries or in clumps located where it will not cause additional cable logging costs.

AFA-4

4. Page 2-2; I recommend that you work to eliminate the OGR strategy. It is silly to have such a strategy in a forest that has had only a small percentage of the acreage harvested. This strategy was adopted through junk science and political science.

AFA-5

5. Page 2-8; I disagree with the decision to not have a maximum timber harvest alternative. An adequate timber supply is the single largest impediment to maintaining and restoring a viable timber industry here in Alaska. You are destroying our future by continually placing roadblocks in the timber supply pipeline.

AFA-6

6. Page 3-5 through 3-12.

- a. Employment has dropped primarily because of a lack of economic timber sales. The markets are not at the 1995 peak, nor are they at a historic low. The problem is the many years of uncontrolled increases in timber sale harvest costs. These costs must be rolled back to a reasonable level. The timber sale contracts must also be revised to restore fairness. The current contracts put nearly all the risk on the purchaser and they take away most cost savings the purchaser might find. This must change in order to have a viable timber industry.
- b. Keep in mind that while there is currently about 300 MMBF under contract, about a third of that is tied up in the GFP bankruptcy. That leaves 200 MMBF and because it takes three years to harvest the average timber sale, only about 70 MMBF per year could currently be harvested at best. Further, many of the current timber sales under contract were purchased, even though they are not economic, because there were insufficient economic sales available to purchase. The purchasers were forced to gamble that a high market would appear to make the sales viable. That hasn't happened and thus only about 1/2 of the 70 MMBF maximum was actually harvested last year. Using any

AFA-7

AFA-8

part of actual harvest levels as part of the demand calculation is improper. The real demand is that amount of timber that is needed to restore a three-year supply at the 360 MMBF level (360 is the level necessary to maintain a viable manufacturing industry).

- c. Although the NEAT analysis has some flaws that result in errors as large as \$100 per MBF, the relative ranking by the NEAT analysis indicates that alternative #4 is the best, so I'll make all my unit specific comments from that alternative. Meanwhile, we will continue working with the Forest Service to help improve your economic analysis.
7. Page 3-13; As mentioned earlier, the wildlife impacts are heavily skewed to exaggerate the negative and the hypothetical impacts are based on junk science and flawed political reasoning. With less than 5% of the Tongass harvested in the last 100 years and with only about 4% scheduled for harvest in the next 100 years, there should be few concerns about wildlife. Further, the Forest Service has demonstrated that they can successfully mimic old-growth characteristics by thinning second-growth stands and through other active management activities on the roughly 10% of the forest that is actively managed. **AFA-9**
8. Pages 3-29 through 3-41; I have seen studies and opinions by fish biologists that indicate the streams in Alaska have stream temperatures and nutrient levels that are below optimum for salmon. The streams must have some sedimentation to support salmon. If the level of sedimentation is too large or too small, then salmon will suffer a loss of habitat. Many of the streams in SE Alaska benefit from increased temperatures and increased sedimentation that result from logging. **AFA-10**
9. Page 3-37; The timing windows listed here restrict construction to two and a half months each year. This is part of the reason it takes three years to harvest the average timber sale. Please consider some relief from this onerous constraint. Other mitigation or a larger window would help a lot. **AFA-11**
10. Pages 3-42 through 3-47; This is a good discussion of the transportation issues.
  - a. We recommend that all the roads in this project be constructed as temporary roads to reduce the cost of managing and harvesting the timber sales. **AFA-12**
11. Pages 3-57 through 3-59;
  - a. The caves can be a significant tourist attraction and my family and I would be interested in viewing them as well. I suggest you put interpretive markers out to indicate the location of caves in the area that could be viewed while people are visiting the area. The Forest Service has a well-developed cave system that I have seen in Arkansas. It is a major tourist attraction. **AFA-13**
  - b. If timber is put off limits to protect the caves, replacement timber should be identified concurrently. Don't make the timber program suffer every time there is a potential conflict with another resource. **AFA-14**
12. Pages 3-66 through 3-68. Bark is not a pollutant and less than 1/100 of 1% of the tidelands in Alaska are affected by LTI bark. Further, the LTI's are sited

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to avoid sensitive areas. One of the major concerns for locating and siting LTFs is safety. The timber industry has adopted a number of BMPs that minimize excessive bark and other impacts. We will continue to look for additional ways to minimize harmful impacts.

AFA-15

13. Pages 3-101 through 3-103; I'm glad to see your research indicates that less than 10% of landslides in SE Alaska are related to logging or roads. I have also noticed that logging activities sometimes cause a short-term increase in minor landslide activity, but the magnitude of those slides is usually less so that the overall impact over time is about the same as without logging. I also have noticed that often a logging road will intercept a small slide before it reaches a stream.

14. Pages A-1 through A-6. In order to sustain a viable manufacturing industry we need a reliable supply of economic timber at a level of about 360 MMBF annually. Since the harvest on the Tongass for the last few years has been constrained to very low levels, there is adequate room within the decadal ASQ to ramp up to that level beginning immediately. We request that you do so.

AFA-16

15. Pages A-6 through A-12; The cost of planning, preparing and administering timber sales on Alaska State lands in SE Alaska is reportedly around \$16 per MBF. Those lands appear very well managed. The Forest Service has told me their timber sale program costs in excess of \$100 per MBF. I suggest you implement a Quality Control program in order to reduce the cost of the timber sale program and to increase the volume of timber sales without an increase in expenditures. Total Quality programs are effective for controlling costs, production, quality, safety and other goals. Let me know if you want help or advice in this regard.

AFA-17

16. The road management objectives for some of the roads indicate that the rock pits should be located about a mile apart. There is a construction technique that utilizes rock from under some of the ditches. In certain locations the overburden is temporarily stripped away along the ditch line. The underlying bedrock is drilled and shot and used along that section of road and the overburden is then used to backfill where the rock was excavated. This technique works well for small, low production construction crews. It should not be prohibited.

AFA-18

17. Unit cards and timber sale design issues; My comments are directed at alternative #4 because it looks like the most economic alternative. Also, my review was done from the maps not from a field review so I assume the layout is done in a way that provides adequate tail-holds and deflection for cable logging and adequate openings and landings for helicopter logging. The maps would be more helpful if they indicated the location of the landings and the temporary roads:

- a. Please don't require a slack line system or other special purpose system unless there is sufficient volume to keep the necessary equipment working productively for at least one season. These specialized pieces of equipment are very expensive.
- b. Unit all units

AFA-19



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- i. Don't prescribe individual leave trees in cable logging units because it is unsafe and because it double the yarding costs. | AFA-20
  - ii. Don't require any snags to be left that might be a hazard to any of the crews (helicopter, cable or shovel crews). | AFA-21
  - iii. If any landings are located along the existing mainline, an adequate clearing should be allowed for line clearance and safety. | AFA-22
- c. Unit 10
  - i. Please insure the unit is designed so that the cable logging around the *Listera* reserves can be protected safely and efficiently. | AFA-23
- d. Unit 19
  - i. I recommend you not leave timber for visual reasons. The timber will likely blow down and look worse than the second-growth. | AFA-24
  - ii. I'm unsure how you intend to allow only small patch cuts in this cable logging unit without a huge cost increase from corridors, temporary roads or some other strategy. | AFA-25
- e. Unit 31
  - i. The SW corner of the unit looks like it is too far from the road to be efficiently cable logged. | AFA-26
  - ii. The west boundary looks like it might create a blind-lead but the landings are not indicated on the map so it's hard to determine. | AFA-26
  - iii. Please be aware that anchor stumps may be a problem for the boundary adjacent to the old logging. | AFA-26
- f. Unit 35
  - i. The operator should be given the authority to temporarily close the roads in this timber sale area in order to insure public safety and efficient logging, especially when landing logs or loading logs on the mainline roads. This unit may not require working along the mainline, but some of the other units will. | AFA-27
- g. Unit 40
  - i. This is a harvest area so I recommend you not leave timber for visual concerns. | AFA-28
  - ii. The partial-suspension requirement seems superfluous given that this is a helicopter-logging unit, but I guess it doesn't hurt. | AFA-29
- h. Unit 43
  - i. Extend the northern boundary all the way to the stream buffer where feasible. Don't leave snags or individual leave trees that will be a hazard or increase the cable logging costs. | AFA-30
- i. Unit 44
  - i. I recommend you expand the west boundary all the way to the mainline to add volume and improve cable-logging costs. There are so many visible second-growth patches on both sides | AFA-31



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of Carroll Inlet that it seems pointless to add costs and constrain the sale volume for visual concerns.

## j. Unit 51

- i. Enlarge the unit and allow shovel logging wherever feasible.

AFA-32

## k. Unit 63

- i. If possible, allow the purchaser to cable-log the lower portion of this unit.
- ii. What is the purpose of the odd shaped boundary in the SE corner of the unit?

AFA-33

## l. Unit 65

- i. Why doesn't the boundary go all the way to the second-growth along the SW boundary?

AFA-34

## m. Unit 70

- i. The unit card says no new roads but the map indicates a road. Is it a temporary road?
- ii. Please insure there are adequate tail-hold stumps on the boundaries along the muskegs.

AFA-35

AFA-36

Sincerely,



Owen Graham  
Executive Director

## Appendix B

### Forest Service Response to Alaska Forest Association:

#### AFA 1:

Forest Service Manual 2670 requires that viable populations of plant and animal species be maintained and that actions which may cause a species to become threatened or endangered be avoided. Those species using forested habitats are more affected (i.e., at risk) by harvest than those species that use openings, so the analysis in the Draft EIS focuses on forest dwellers. The deer, wolf, and marten were discussed in detail in the Draft EIS because they are considered Management Indicator Species (MIS) which are used to generally represent a wider range of species using forested habitats.

Although deer do use recently harvested areas, the decreases in habitat referred to in the Draft and Final EIS are related to the most recent version of the deer habitat capability model. This model analyzes the value of habitat for deer in the winter. Winter is considered the most difficult season for deer populations because of the difficulty in finding forage. Therefore, areas that receive less snow are considered to be of higher value. Harvested areas tend to accumulate snow and receive a lower value than those areas with large trees. In addition, the Draft EIS projects what the effects might be in the future (over the length of the rotation). Harvested areas have some value for deer associated with the increase in forage. However, when canopy closure occurs approximately 25 years after harvest, forage production drops significantly due to the lack of sunlight reaching the forest floor. At this point, the habitat value for deer goes almost to zero. Some of the "negative" effects in the Draft EIS are related to this future condition.

Deer are the principal prey for the wolves in Southeast Alaska. The wolf analysis in the document references the anticipated deer changes to help determine possible effects on the wolf population. The changes estimated for the wolves are directly related to those predicted for the deer, as explained above.

The marten analysis also refers to habitat changes. High-value marten habitat is defined as high-volume stands below 1,500 feet in elevation. Harvest in this habitat is reflected in the numbers presented in the wildlife section of the document. Only those acres of harvest considered to be high-value marten habitat are discussed in the marten section - not all of the harvest taking place in the project causes a decline in this habitat.

#### AFA 2:

The Shoal Cove dock has been and will continue to be open to the public. Alternative 4, the Preferred Alternative, would leave open to vehicular traffic the road from the Shoal Cove LTF, the current main road running north to and through the project area just inland from Carroll Inlet (8400 road), and the extension of this latter road which turns inland and climbs to a higher elevation (the 8446 road). Road 8400/450 at the southern edge of the project area would remain open for part of the year and closed seasonally to reduce road maintenance costs. Other roads in this area would be closed to vehicular traffic by pulling culverts or by the installation of barriers after timber harvest is completed. However, they would be available for hiking or biking. All new roads built for this project would be closed after harvest and silvicultural activities are completed.

#### AFA 3:

Since the Forest Service is currently mandated by Congress to sell timber on a CCF basis, we have displayed our analysis in CCF. Using a factor of 2 is an approximate conversion between MBF and CCF. For example, if a timber sale volume consists of 12,000 CCF, the MBF approximate equivalent would be calculated as follows: 12,000 CCF divided by 2 is 6,000 MBF or 6 MMBF. The harvest cost conversion from CCF to MBF could also be approximated using a factor of 2. For example, if the logging cost/CCF for a particular timber sale are \$130.64/CCF, then those costs converted to approximate costs/MBF would be calculated as follows:  $\$130.62 \times 2 = \$261.80/\text{MBF}$ .

On page S-4 of the Draft EIS, the proposed harvest volumes by alternative are displayed in both CCF and MMBF. Additional references to MBF have been made in the Final EIS.

#### AFA 4:

On page 3-9, Table 3-3 of the Draft EIS, the advertised rate/CCF is displayed for each of the action alternatives. Only Alternative 4 has a positive value. It is important to realize each alternative is analyzed independently as a stand-alone alternative and the alternatives are not combined in terms of "the EIS as a whole".

Only 9 acres of cable ground are prescribed for group selection. Group selected stands are windfirm. This prescription occurs in the eastern portion Unit 19 to mitigate visual concerns from Carroll Inlet. Trees that are required to be left to meet Marten Standards and Guidelines may be, according to the Forest Plan (pg 4-119) "clumped for operational concerns or ecological opportunities."

The majority of the harvest units retain timber in clumps located where they will not cause additional cable-logging costs. All helicopter units will retain some trees for either wildlife, visual or economic reasons. Retaining the less-economic species or less-economic diameter classes in some species can help in reducing helicopter-yarding costs.

**AFA 5:**

The Old-growth Reserve strategy is part of the Forest Plan, and any proposed changes to the strategy will be addressed during the Forest Plan revision process.

**AFA 6:**

The rationale for eliminating this alternative from further consideration is given in Chapter 2 of this Final EIS. The IDT developed a unit pool that was outside of Inventoried Roadless Areas and any roadless area subject to the Roadless Area Conservation Rule. As a result, much of the suitable timber base was not included in the formulation of alternatives, and a maximum timber harvest alternative for the entire project area was not considered.

**AFA 7:**

Development of timber sale economics begins in the planning stage. The Licking Creek Timber Sale displays a range of alternatives that were developed to address the significant issues raised during scoping. To address these issues - whether they are wildlife, scenery or fisheries concerns - trade-offs are often made. As a result, not all alternatives result in a positive stumpage value. This is the case with the Licking Creek project.

The timber sale contract is designed to protect the rights of both parties.

**AFA 8:**

Appendix A in this Final EIS displays how the Forest Service develops expectations about future timber markets and demand over the planning cycle and how the Forest Service documents demand on a project-by-project basis through the development of the *Tongass Ten Year Timber Sale Schedule*.

**AFA 9:**

Wildlife species on the Tongass are usually analyzed by looking at their respective habitats. Many species are dependent in some way on timbered areas. Thus, when harvesting occurs, some amount of habitat is lost. Stating in the Draft EIS that a certain percentage of habitat decline will occur does not necessarily equate to a negative impact, just that a change is occurring by that amount.

**AFA 10:**

You did not provide actual citations of studies or fish biologists that indicate streams in Alaska have stream temperatures and nutrient levels that are below optimum for salmon. Increased stream temperatures and increased sedimentation resulting from logging activities are not necessarily beneficial to streams. State and federal regulations, as well as Forest Plan Standards and Guidelines, require the Forest Service to maintain existing water quality. This project includes mitigation specifically designed to maintain stream temperatures and minimize erosion and sedimentation.

**AFA 11:**

The timing windows for instream construction apply to all road-building activities on the Forest, not just this project. The Final EIS states the rationale for this timing under Direct and Indirect Effects of Roads—Instream Timing Restrictions. Timing windows can be altered based on stream-specific information. Although the road cards (Appendix B of the Draft EIS) show timing information for certain crossings, the crossings may already be in place and would not need to be replaced or repaired before logging operations begin. You can find an example of this on existing road 8400000. Or, a fish crossing may need to be replaced, but timing restrictions were lifted due to low impact on downstream fish habitat, as for milepost (MP) 35.162 of road 8400000.

**AFA 12:**

Temporary roads are appraised and paid for at a lower cost per unit distance because they are constructed to a lower construction tolerance and standard. A temporary road is recommended when it is determined that the road would have lesser impacts on other forest resources, and there is no need to control location. Temporary roads do not contain excessively steep grades, excessive excavation or borrow excavation, or large culverts.



## Appendix B

A classified road is necessitated by the need for a higher degree of control or construction standard. Location controls regarding difficulty of construction due to grade, excavation, borrow excavation, bridges, or large culverts, are intended to limit adverse impacts to forest resources such as fisheries, karst, soils, or wildlife. Classified roads are surveyed and designed so control is established. This control results in a higher cost per unit distance.

Long-term planning for location of classified roads allows them to be used currently and in the future without high-dollar maintenance, and limits the cost of reinvestment for future use. Classified road construction limits the degradation of impacted forest resources.

### **AFA 13:**

The Federal Cave Resource Protection Act, Sec.5, Confidentiality of Information Concerning Nature and Location of Significant Caves, states that, "(a) IN GENERAL. Information concerning the specific location of any significant cave may not be made available to the public under section 552 of title 5, United States Code, unless the Secretary determines that disclosure of such information would further the purposes of this Act and would not create a substantial risk of harm, theft, or destruction of such cave." The 1997 Forest Plan, Cave Resource: Cave, 1. Management (E.) states that the Forest will "Classify caves based on management objectives consistent with identified cave resource values." The caves of the Licking Creek project area have not been comprehensively inventoried or mapped; therefore, the resource values of those caves have not been determined. The caves found so far generally have vertical entrances or are prone to flooding. Such caves would be classified as "Sensitive Caves" under the current Forest Plan Guidelines and considered unsuitable for exploration by the general public.

### **AFA 14:**

There is a finite amount of suitable and available timber on any project. The suitable and available timber for the Licking Creek project was identified using aerial photographs, topographic maps, GIS and on-the-ground surveys. The Forest Service must implement Standards and Guidelines as part of the Forest Plan. One reason for gathering on-the-ground, site-specific information for such features as karst or fish streams locations, sensitive slopes, etc. is to identify those resources that, under the Forest Plan, require protection. During the analysis for the Forest Plan, a Management Implementation Reduction Factor (MIRF) was used to account for lands taken out of timber production due to application of Standards and Guidelines. The possibility of finding caves and karst were accounted for in this process.

### **AFA 15:**

Bark may impact marine organisms through smothering, and alteration of habitat and water quality (Forest Plan, Appendix G-7). It is deposited into the marine environment when log rafts are stored at the LTF. As such, survey dives are conducted yearly while the site is active, to ensure that deposition levels and possible accumulation are kept within State standards. This is part of the State's permitting requirements.

### **AFA 16:**

Appendix A of the Licking Creek Draft EIS displays how the Forest Service develops expectations about future timber markets and demand over the planning cycle and how the Forest Service documents demand on a project by project basis through the development of the Ten Year Timber Sale Schedule. The Forest Plan limits timber volume to an Allowable Sale Quantity of 267 MMBF annually. Changing the Allowable Sale Quantity is a Forest Plan issue and beyond the scope of this project.

See also response to AFA Comment 6.

### **AFA 17:**

The Forest Plan must follow all Federal laws and regulations for analyses and public processes for timber sale planning projects. The State of Alaska follows State laws and regulations for planning timber sales. The two processes for comparing planning costs between Forest Service timber sales and State timber sales are not the same, and such consistency is outside the scope of this project.

### **AFA 18:**

Rock pit location is determined primarily by the quality of rock in the project area. A secondary determination is forest economics, which includes resource protection. Haul costs are mainly a function of distance between rock resources.



Contractors are encouraged to utilize all rock developed during ditchline construction, rock developed during all phases of road construction, as well as rock developed during the prudent placement of turnouts, pullouts, landings, and staging areas.

Any areas exposed during road construction are required to be rehabilitated by replacement of overburden, grass seeding and clean up.

The use of multiple small rock pits at distances shorter than rock quality and haul economics demand, and that result in adverse impacts to forest resources will be prohibited.

## **AFA 19:**

Approximately 61 acres are anticipated to require a long-line cable system for Alternative 4 and to a lesser degree for Alternatives 2 and 3. The costs associated with this system will be reflected in the timber sale appraisal. In order to maximize the amount of timber available in this Final EIS some long line equipment use is necessary. An alternative system would be the use of a helicopter that is even more expensive than the slackline machine. A slackline system is more expensive to operate than short span systems such as highlead or running skyline.

## **AFA 20:**

Only 9 acres are prescribed for group selection. The unit where this prescription occurs is Unit 19. See also response to AFA Comment 4.

## **AFA 21:**

Most snag retention has been left in clumps located where they will not be hazards to logging operations. Any other trees that are located outside or on the edges of these clumps will only be retained if they meet the Reserve Tree Selection Guidelines (R10-MB-215, March 1993), developed by the Forest Service in coordination with the timber industry and OHSA. Forest Service timber sale administrators are familiar with these guidelines and use them to help maintain a safe workplace.

## **AFA 22:**

Landing locations along existing mainline roads shall address all safety concerns and shall be mutually agreed upon by the purchaser and the Forest Service. A timber sale contract plan of operation submitted by the purchaser shall address operating procedures and safety precautions as indicated in standard Forest Service timber sale contracts. All operating plans submitted by the purchaser shall be approved by the Forest Service within 60 days of final award of a timber sale contract. A specific traffic control plan is agreed to between the purchaser and the Forest Service prior to commencing operations on a timber sale.

## **AFA 23:**

These areas are very small and well marked on the ground. Logging around these sensitive plants should not pose a problem.

## **AFA 24:**

In order to meet Standards and Guidelines, some timber must be deferred to meet these visual constraints. Unit 19 is in the foreground seen area from Carroll Inlet and is allocated to Modified Landscape. The Forest Plan adopted Visual Quality Objective is Partial Retention. To meet this objective, the more visible steeper portions of the unit facing the water need to have some forested texture maintained. Clearcutting the entire unit would not meet the Partial Retention objective. It is possible that some windthrow would occur. However, there are many cases where some windthrow in an uneven-aged managed area would have less visual impact than clearcutting the entire area.

## **AFA 25:**

Unit 19 is 42 acres in size, of which nine acres are prescribed for group selection. Corridors would be required that result in additional logging costs. This cost increase would be reflected in the appraisal.

## **AFA 26:**

Profiles and payload analysis have been run for this unit and are available at the Ketchikan-Misty Fiords Ranger District office. The analysis indicates that the SW corner can be cable logged. The southeast boundary of Unit 31 is adjacent to a previously harvested area. Care would be taken during layout to ensure adequate tailholds are available.

## Appendix B

### AFA 27:

Authority to close or restrict road use resides with the Forest Service. Should safety become an issue, corrective action would be taken. This action could result in some type of closure or road use restriction.

### AFA 28:

In order to meet Standards and Guidelines, some timber must be deferred to meet these visual constraints. Unit 40 is also located in a middleground seen area that has been allocated to Modified Landscape. The Forest Plan-adopted Visual Quality Objective in this instance is Modification. Because of the current impact from past harvest in this part of the viewshed and the impact of a Madder Timber Sale unit that is yet to be harvested, it is necessary to lessen the impact of Unit 40 by retaining some forested texture in part of the unit.

### AFA 29:

Best Management Practices (BMPs) are used for the protection of water quality. BMP 13.9 specifies the selection of appropriate yarding systems to protect soils and water resources. For this unit, partial suspension is the minimum yarding requirement and is specified in the unit card. It is understood that helicopter harvest would exceed this requirement, by achieving full suspension, and would ensure compliance with this BMP during implementation.

### AFA 30:

The northern portion of the unit was not extended all the way to the stream buffer, because that portion of the unit was in Inventoried Roadless Area as delineated during the development of the 2003 Forest Plan Supplemental EIS for wilderness designation. See the Roadless Area section in Chapter 3 of the Licking Creek Draft EIS.

### AFA 31:

The unit was not extended west to the mainline because to do so would have put that portion of the unit within the 1,000-foot beach fringe buffer.

### AFA 32:

Unit 51 is surrounded by timber below 8,000 MBF/acre. All the merchantable timber has been included in the current unit configuration. The unit is located on a knob and is best suited for short-span cable yarding.

### AFA 33:

If the operator can ensure resource protection, the Forest Service may consider cable logging the lower portion of this unit. This option would be considered during unit layout.

The boundary of this unit was designed not to enter any roadless area subject to the Roadless Area Conservation Rule. See Figure 3-11 in this Final EIS.

### AFA 34:

The area you mention is a marsh and beaver pond complex with riparian buffer.

### AFA 35:

The unit card narrative in the Draft EIS is not correct. This is a temporary road.

### AFA 36:

We would insure there are adequate tailhold stumps.

# STATE OF ALASKA

## OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET  
DIVISION OF GOVERNMENTAL COORDINATION

FRANK H. MURKOWSKI,  
GOVERNOR

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January 20, 2003

Jerry Ingersoll  
Ketchikan-Misty Fiords Ranger District  
U.S. Forest Service  
3031 Tongass Ave.  
Ketchikan, Alaska 99901

Dear Mr. Ingersoll:

SUBJECT: Licking Creek Timber Sale DEIS  
STATE I.D. NO. AK 0212-03  
NEPA and Preliminary ACMP Reviews

On December 2, 2002, the Division of Governmental Coordination received a Draft Environmental Impact Statement (DEIS) for the Licking Creek Timber Sale on Revillagigedo Island. The DEIS was developed to satisfy the requirements of the National Environmental Policy Act (NEPA). Also, according to the State/Forest Service Memorandum of Understanding, the Forest Service submitted a federal consistency determination. The State has prepared NEPA comments and has developed preliminary consistency comments, which are attached.

### Project description

The activity subject to this review is the harvest of timber and road construction on the Ketchikan-Misty Fiords Ranger District of the Tongass National Forest. The proposed action, Alternative 4, would configure harvest units to emphasize timber sale economics, harvest 33,556 CCF (16.8 MMBF) of timber from an estimated 790 acres, and would reconstruct 1.65 miles of existing road, develop 3.13 of new road, and 2.36 miles of temporary road.

Other alternatives include Alternative 1, a no action alternative, Alternative 2, which would provide 10,709 CCF (5.4 MMBF) of timber while minimizing potential effects to wildlife, watersheds, and scenery, Alternative 3, which would harvest 23,832 CCF (11.9 MMBF) of timber while minimizing harvest on critical deer winter range and wildlife habitats, and Alternative 5, which would harvest 32,361 CCF (16.1 MMBF) without any construction of new roads on the project area.

## Appendix B

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Licking Creek Timber Sale DEIS  
AK 0212-03J

Page 2

January 20, 2003

### Additional Information desired

The Alaska Department of Environmental Conservation has requested a watershed analysis, which, although not required by the Forest Plan, is highly desirable given the extensive cumulative harvesting that has occurred in several of the watersheds within the project area, and their degraded conditions.

DGC-1

DEC has also requested that the Forest Service include in the ROD and the FEIS the documentation for the analyses for allowing harvest on slopes greater than 72 percent, which were referenced on pages 2-3 of the DEIS.

DGC-2

Finally, DEC requests that the Forest Service state what transfer method will be used for harvested timber at the Licking Creek project area.

DGC-3

The Alaska Department of Fish & Game requests documentation of site-specific information regarding the location and extent of remaining coarse-canopy, high volume stands. ADF&G requests that the Caouette Vegetation Structure maps or at least maps showing VC 6 and 7 stands, be provided for the project area as part of the Project Clarification, prior to the issuance of the FEIS.

DGC-4

ADF&G also recommends that adequate surveys and research be conducted to assure Band-tailed pigeon viability on the Tongass. Specifically, ADF&G recommends that the Forest Service analyze how breeding colonies of Band-tailed pigeons can be maintained on the Tongass and provide a professional assessment of viability concerns within the FEIS within the FEIS for this project, followed by monitoring in the Licking Creek project area.

DGC-5

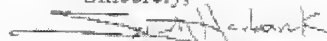
Other information needs are detailed in the attached agency comments.

### Recommendation

The State of Alaska, through the ADEC and ADF&G comments, fully supports and strongly recommends that the Forest Service select Alternative 2 for the ROD. The State does not support the selection of Alternative 4 due to its high potential for contributing to and exacerbating cumulative watershed impacts and potential for habitat losses and impacts to wildlife.

If you have any questions regarding this process, please contact me at 907-465-8791 or email [sandy\\_harbanuk@gov.state.ak.us](mailto:sandy_harbanuk@gov.state.ak.us).

Sincerely,



Sandy Harbanuk

Project Review Coordinator

Enclosures



**Forest Service Response to State of Alaska Division of Governmental Coordination:****DGC 1:**

Management evaluated whether to conduct watershed analyses within the project area and decided not to for several reasons. There is no significant fish habitat in relation to production capabilities of other areas on the Forest. The project fully implements all Forest Plan Standards and Guidelines. The Draft EIS describes the composition of channel types that consist of mostly high gradient, hard bottomed, transport channels. The Final EIS (page 3-34) describes how watershed conditions were considered in alternative development. The resiliency of the stream channels, mostly high-gradient contained or hard bottomed, and low quality in terms of fish production, acts to negate the level of concern from the previous harvest level. The best habitat that does exist within the project area, floodplain habitat, occurs in Licking Creek proper and most of that has already been harvested. The Forest Service planted spruce seedlings in the floodplain riparian management area and survival surveys show the trees growing well as can be expected.

In summary, there is no significant habitat or populations downstream of sediment sources (transport stream systems); there is little if any impact expected from both past and proposed activities.

**DGC 2:**

Documentation of the results of field visits to slopes greater than 72 percent is included in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record. Site-specific management recommendations can be found in the Unit Cards in Appendix B of the Draft EIS.

**DGC 3:**

Currently, the LTF at Shoal Cove is designed and permitted for use as either a barge or rafting facility. Our analysis was based on the impacts of rafting logs, which are greater than barging logs. It is important that the Forest Service allow contractors the flexibility to transport logs from the uplands to the water. The timber sale contract does not have language that restricts LTF usage other than for timing. The State of Alaska tidelands permit and Corps of Engineers permit for the Shoal Cove LTF governs the method of log transfer to the saltwater. The Forest Service will continue to offer operators the option of either rafting or barging logs as long as the permits allow both entry systems.

**DGC 4:**

Table 3-24 in the Final EIS lists the number of acres of coarse canopy stands proposed for harvest by alternative. We do not have site-specific information on coarse-canopy stands that have been field verified. Volume classes 6 and 7 provide a rough estimate of coarse canopy structure (Caouette, et. al., 2000). A map showing the location of volume class 6 and 7 stands within the project area is in the project planning record.

**DGC 5:**

Band-tailed pigeons are not listed as a threatened or endangered species anywhere in their range, and are not listed as a sensitive species by the Alaska Region. They are also not covered on the list of migratory birds to monitor in Alaska. We are aware that the population in the project area represents the northernmost extent of the species and an opportunity for research. Although the birds have been seen during the breeding/nesting season, no nests were ever located. Another survey is being done in Spring 2003 to locate a nest(s). If a nest were located it would be feasible to consider additional options. However, we propose to monitor the area for 3 years post-harvest to determine whether or not the birds return to the area and continue to exhibit behavior consistent with breeding.

## MEMORANDUM

State of Alaska

RECEIVED

Department of Environmental Conservation

TO: Sandy Harbanuk  
Project Review Coordinator  
OMB - DGC

Ketchikan City Fields  
Tongue District

DATE: January 16, 2003

FILE NO: AK0212-03JJ

THRU:

TELEPHONE NO: 465-5364

FROM: Kevin J. Hanley *KJH*  
Environmental Specialist  
Division of Air and Water Quality

SUBJECT: Licking Creek Timber Sale DEIS

The Department of Environmental Conservation has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Forest Service's proposed Licking Creek Timber Sale on Revillagiedo Island. Specifically, this project proposes to harvest between 5.4 and 16.8 MMBF of timber from approximately 253 to 790 acres, and to construct up to 5.49 miles of new road, and reconstruct up to 4.11 miles of existing road, depending on alternative. Associated with this project is the use of an existing permitted log transfer facility (LTF) site at Shoal Cove. Any modifications to this facility will undergo a separate Alaska Coastal Management Program (ACMP) consistency review, and will be subject to an ADEC Certificate of Reasonable Assurance (401 Certification).

The DEIS identified Alternative 4 as the Forest Service's preferred alternative for this project. This alternative proposes to harvest approximately 16.8 MMBF of timber from an estimated 790 acres, and would involve the reconstruction of 1.65 miles of existing road and the development of 3.13 miles of new specified road and 2.36 miles of temporary road. We offer the following comments which address ACMP, Clean Water Act (CWA) Section 319, and NEPA concerns:

## NEPA &amp; CWA SECTION 319 COMMENTS

1. Cumulative Watershed Effects and Lack of Watershed Analysis

The DEIS (page 3-34) states that "According to direction issued in the Forest Plan, Appendix J, a Watershed Analysis is not required if a timber sale will fully implement the Forest Plan Standards and Guidelines. The Licking Creek project does not require a watershed analysis because we will fully implement Standards and Guidelines on all streams in the project area." While it is true that a watershed analysis is not required by the Forest Plan, given the extensive cumulative harvesting that has occurred in several of the watersheds within the project area, and their degraded conditions, a watershed analysis should have been completed. This is particularly true for the Easy Creek, Marble Creek, and Unnamed 19 watersheds, which have cumulative harvesting percentages of 31%, 28%, and 43%, respectively. According to the DEIS, the main streams within each of these watersheds have been degraded by this cumulative harvesting. For example, the DEIS (page 3-32) states that "Thirty-two percent of the Class II RMA was harvested in Easy Creek in 1972. This harvest occurred both above and below Road 8400000. Tall alders dominated the canopy and the channel appeared significantly widened, as evidenced by shallow stream banks. Most of the substrate consisted of large cobble and boulder, which was larger

DEC-1



*material than that found in most of the watershed streams ... Within this watershed, but outside of the project area, the Road 8400441 washed out above the intersection with Road 8400440; this erosion may have affected downstream fish habitat." Marble Creek is described as having "experienced substantial riparian timber harvest along Class II portions of the stream system. Approximately 7,800 feet of harvested stream channel, above Road 8400000, showed decreased habitat complexity and loss of large woody debris." And the channel in Unnamed 19 watershed "was showing widening and deposition of material." Licking Creek also is degraded due to past harvesting. According to the DEIS (page 3-31), "Approximately 28 percent of the Class II Riparian Management Areas (RMAs) in the Licking Creek watershed experienced harvest in 1992-1993. This included some harvest of floodplain RMA. During recent surveys, we found that the channel depth was shallower and flows were swifter in the harvested area than in the floodplain upstream. Additionally, after construction of Road 8446200 and timber harvest in the watershed, small landslides occurred that crossed the road and entered the floodplain."*

These conditions should have raised red flags and triggered the need to complete a watershed analysis for each watershed prior to planning additional harvesting, especially clearcut harvesting. However, even without a watershed analysis, the degraded conditions of these watersheds should preclude proposing additional clearcutting and road construction. Instead, any additional harvesting within these watersheds should be limited in scale, and should be done using uneven-aged management prescriptions such as diameter limit or group selection that retain substantial portions of the existing stands. These prescriptions would better ensure that slope stability and hydrologic processes and conditions, including runoff timing and yield, and stream channel stability, substrate composition, and fish habitat are maintained and not further degraded by this additional harvesting. Implementing Alternative 2 would best accomplish this, as it avoids Unnamed 19 watershed altogether, and greatly minimizes harvesting and road construction within the Marble Creek, Easy Creek, and Licking Creek watersheds. Therefore, we **fully support and strongly recommend the selection of Alternative 2 for the ROD**, particularly if the silvicultural prescriptions for the small number of units in these watersheds were changed from clearcutting to uneven-aged management. Conversely, we **do not support the selection of Alternative 4 due to its high potential for contributing to and exacerbating existing cumulative watershed impacts**.

## 2. Clearcutting as the Predominant Silvicultural Prescription

We were surprised at the extent to which clearcutting is prescribed for all of the action alternatives for this project, particularly since one of the Forest Plan's objectives for Modified Landscape and Timber Production LUDs is to "seek to reduce clearcutting when other methods will meet land management objectives." According to the DEIS (Table 3-35), 96 to 100 percent of the acres to be harvested will be clearcut, depending on alternative. Of particular concern with this amount of clearcutting, especially that proposed under Alternative 4, is the potential for additional cumulative watershed effects, especially within the Easy Creek, Marble Creek, Unnamed 19, and Licking Creek watersheds which, as discussed above, have experienced substantial harvesting in the past. Given the documented impacts to channel morphology and fish habitat within these watersheds, uneven-aged silvicultural prescriptions should be proposed to more effectively mitigate the potential for additional hydrologic- and sediment-related impacts.

DEC-2

An uneven-aged prescription that involved a two-aged, diameter limit harvest was successfully implemented and broadly applied using uphill cable yarding systems for the Crane and Rowan Mountain Timber Sale on Kuiu Island. That prescription called for the harvesting of all western hemlock between 16 and 38 inches in diameter, all Alaska yellow cedar greater than 24 inches diameter, and all Sitka spruce greater than 16 inches in diameter except for one large decadent Sitka spruce every 10 acres. It resulted in the retention of all western hemlock and Sitka spruce less than 16 inches in diameter; all Alaska yellow cedar less than 24 inches in diameter; all western hemlock greater than 38 inches in diameter, and one large decadent Sitka spruce every 10 acres. This prescription was designed with both wildlife habitat and watershed concerns in mind, and was developed to emulate the natural windthrow disturbance regime of Kuiu Island. Although wind has a much greater influence on the disturbance ecology of Kuiu Island than it does on that of the Licking Creek project area, such a prescription would better mitigate the effects of harvesting on both wildlife habitat and watershed processes, as it would result in the retention of approximately 50 percent of the overstory canopy cover. Therefore, as discussed above, we strongly recommend that the silvicultural prescriptions for the units within the Easy Creek, Marble Creek, and Licking Creek watersheds be changed from clearcut with reserves to a similar two-aged or other uneven-aged prescription that retains a significant portion of the existing stands. Most of these units are characterized as having low to moderate windthrow potential and, therefore, subsequent blowdown of the residual trees should not be an issue. In addition, as proposed under Alternative 2, no additional harvesting or road construction should occur in Unnamed 19 watershed due to the substantial cumulative effects that have already occurred.

DEC-3

DEC-4

Regarding windthrow potential, the DEIS (page 3-88) implies that clearcutting mimics the natural disturbance regime within the project area, and states that it is prescribed in locations that are most susceptible to large-scale windthrow events. However, such events are rare in this portion of the Tongass, with the disturbance regime characterized, predominantly, by gap-phase succession. Specifically, the DEIS (page 3-88) states that *"Clearcuts mimic natural processes and are prescribed in topographic locations that are most susceptible to recurring, large-scale wind disturbance, such as south/southeast facing slopes, ridge noses, and hilltops ... Uneven-aged management is most successfully prescribed in wind-protected landscapes, where small-scale, gap-phase dynamics naturally occur."* However, as indicated above, 96 to 100 percent of the harvest units are proposed for clearcutting with, apparently, no regard to their positions on the landscape or their natural disturbance histories. From the quotation cited above, this would imply that all of the units are located in topographic settings that are subject to recurring large-scale windthrow events, and that is the reason that they are prescribed for clearcutting. However, this is not the case, as is demonstrated on the unit cards which characterize the vast majority of the units as having low to moderate windthrow potential. For example, according to the Silviculture section of the unit card for Unit 63, *"the stand displays low windthrow potential and gap phase disturbance dynamics."* However, it is prescribed for clearcut with reserves. A similar narrative occurs on the card for Unit 67, which is also prescribed for clearcut with reserves.

DEC-5

Consequently, if mimicking natural disturbance processes truly were an objective of this project, then clearcutting would be minimized, and uneven-aged management prescriptions would predominate, as gap-phase succession is the principal disturbance regime within the project area. As indicated above, we strongly recommend that Alternative 2 be selected for the ROD. In



Sandy Harbanuk

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January 16, 2003

addition, the silvicultural prescriptions for the units within the Easy Creek, Marble Creek, and Licking Creek watersheds should be changed from clearcut with reserves to uneven-aged prescriptions that retain significant portions of the existing stands and better emulate gap-phase successional dynamics.

### 3. Harvesting on MMI4 Soils and on Slopes Greater Than 72 Percent

According to the DEIS (page 3-103), "*All alternatives meet Standards and Guidelines and the Forest-wide strategy for soil protection.*" However, it appears that harvesting is proposed on areas of MMI4 (very high mass movement index) soils, which the Forest Plan has designated as unsuitable and not available for timber production (i.e., harvesting is not allowed).

For example, Table 3-40 of the DEIS (page 3-102) indicates that 9.3 to 54.6 acres of MMI4 soils will be harvested, depending on alternative. In addition, as shown on the unit card maps, all of Unit 22 and nearly all of Units 1 and 24 are located on MMI4 soils. If this is the case, then to be in compliance with the Forest Plan, all such areas of MMI4 soils must be deleted from harvest consideration.

DEC-6

In addition, although the DEIS (page 3-102) states that "*In most harvest units, the slopes exceeding 72 percent are short pitches adjacent to cliffs or rock outcrops, and do not present an actual risk for mass movement,*" several units, such as Unit 12, contain many acres of slopes greater than 72 percent, and others, such as Units 2, 8, 9, 10, 19, 22, 29, 31, 34, 35, 39, 40, 44, 64, 65, and 71 contain slopes greater than 72 percent at or near their unit boundaries that could have logically been excluded. These areas comprise from 34.4 to 76.3 acres, depending on alternative. While we do not mean to second-guess the soil scientist's assessment of the stability of these steep slopes, we are concerned that, for the most part, only partial suspension is recommend to minimize the potential for slope failures. This is particularly true for slopes that greatly exceed 72 percent, such as those found in Units 12, 24, 44, and 65 which are up to 90 percent in gradient. Therefore, we highly recommend that all units containing slopes greater than 72 percent located at or near the unit boundaries either be reconfigured to avoid these areas during cable yarding operations, or that skyline or helicopter yarding systems that are capable of achieving full suspension be used. This would more effectively mitigate the potential for slope failures during yarding operations.

DEC-7

### 4. Documentation of the Analyses for Allowing Harvest on Slopes Greater than 72 Percent

TLMP standard and guideline S&W112.IA.5 states "*At the Forest Plan level, slope gradients of 72% or more are removed from the tentatively suitable timber base due to high risk of soil mass movement and accelerated erosion of class IV channel systems. At the project planning level, the Forest Supervisor or District Ranger may approve timber harvest on slopes of 72% or more on a case-by-case basis, based on the results of an on-site analysis of slope and class IV channel stability and an assessment of potential impacts of accelerated erosion on downslope and downstream fish habitat, other beneficial uses of water, and other resources.*"

The DEIS (page 2-3) indicates that on-site analyses were completed by a soil scientist within potential harvest units containing slopes greater than 72 percent; however, no documentation of

DEC-8

those analyses is presented other than the statement that *"Only areas with relatively low levels of risk are included in the unit pool."*

According to the TPIT clarification on this issue, *"To document the analysis for allowing the harvest the following Checklist should be used:*

*Steepness:*

*Dissection:*

*Parent Material:*

*Drainage:*

*Potential impacts on downstream beneficial uses:*

DEC-8,  
cont.

*If the analysis is undertaken prior to the signing of the ROD, then the approval (if approved) should be located in the ROD and FEIS. If the information is not available prior to the signing of the NEPA document, then it should be located in the Change Analysis (documentation of changes made between the ROD and on-the-ground activities)." Although this harvesting has yet to be approved, the analyses have already been completed and, therefore, the results should have been documented in the DEIS. However, since they were not, the results should be summarized in the FEIS. We would appreciate receiving a copy of the unit-specific analyses once the harvest is approved by the Forest Supervisor or the District Ranger.*

DEC-9

#### 5. Shoal Cove Log Transfer Facility

According to the DEIS (page 3-66) the existing Shoal Cove LTF *"is an A-frame and land-to-barge facility that required the construction of a rock bulkhead into the water to operate the facility."* In addition, the DEIS (page 3-67) states that *"The LTF could also be used for barging at times of high tide, when water depth is adequate. The use of a barge would be optional, under the action alternatives."* Consequently, it is not clear as to what transfer method will actually be used for the Licking Creek Timber Sale. However, since barging is indicated as being feasible at this site, it should be used in lieu of conventional inwater log transfer and storage to avoid the deposition of additional bark on the benthic habitat at the LTF site. This is particularly important, since the expected life span of this facility is estimated to be from 30 to 40 years, and a substantial amount of bark could accumulate over time.

DEC-10

#### 6. Unit-specific Comments

Units 14, 29, 35, 38, and 39: The Soils narratives on the unit cards for these units indicate that no harvest will occur on slopes greater than 72 percent. However, according to the unit card maps, each of these units contains such slopes. In addition, the Soils narrative for Unit 40 states *"No resource concerns were identified during an on-site investigation;"* however, this unit also contains slopes greater than 72 percent gradient. These discrepancies need to be corrected prior to release of the FEIS, with appropriate mitigation measures prescribed to minimize the potential for slope failures.

DEC-11

Unit 12: The Soils narrative on the unit card for this unit states *"The results of an on-site stability investigation determined that slopes greater than 85% in the southern 2/3 of the unit should be excluded from harvest in order to avoid unstable soils."* However, this does not appear to have

DEC-12



Sandy Harbanuk

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January 16, 2003

been done as, according to the unit card map, substantial portions of this unit occur on slopes greater than 72 percent, including the southern 2/3 of the unit. In addition, the Class IV stream that will be affected during logging operations is directly tributary to a Class II FP4 (floodplain) channel located a short distance downstream of the lower unit boundary. Any sediment that is generated as a result of slope failures in the vicinity of this Class IV stream would be delivered to this depositional reach of resident fish habitat. Consequently, given the extent of slopes greater than 72 percent within this unit, and the fact that the affected Class IV stream is directly tributary to a Class II floodplain channel, the vast majority of this unit should be dropped from harvest consideration.

DEC-13

### ACMP COMMENTS

Pursuant to 6 AAC 50 of the Alaska Coastal Management Program and 11 AAC 95 (the Forest Practices Regulations), the department concurs with the Forest Service's consistency determination for this project. Our concurrence applies only to the water quality aspects of this sale. We are able to agree with this determination based, in large part, on the level of information that was provided concerning the proposed road maintenance and closure methods. In addition, the full implementation of the TLMP process group standards and guidelines (RIP2.III.E) along all Class I, II, and III streams within the project area provides reasonable assurance that yarding will be carried out consistent with the standards of 11 AAC 95.360(a). As indicated earlier, we strongly recommend that the Forest Service select Alternative 2 for the Record of Decision for this project, as it best ensures the maintenance of water quality and fish habitat. In addition, if feasible, the silvicultural prescriptions for those units located in the Easy Creek, Marble Creek, and Licking Creek watersheds should be changed from clearcut with reserves to uneven-aged prescriptions to more effectively mitigate the potential for additional hydrologic- and sediment-related impacts in these substantially harvested watersheds.

We appreciate the opportunity to comment.

cc: Chris Foley, ADEC  
 Jack Gustafson, ADF&G  
 Moira Ingle, ADF&G  
 Tom Paul, ADF&G  
 Ed Grossman, USF&WS  
 Jonathan Freedman, USEPA  
 Kathy O'Connor, USFS  
 ✓ Jerry Ingersoll, USFS  
 Ann Puffer, USFS

## Appendix B

### Forest Service Response to State of Alaska Department of Environmental Conservation:

#### DEC 1:

See also the response to DGC Comment 1. The level of harvest was considered in our analysis. The project area contains very little high-quality fish habitat in terms of MM (moderate gradient mixed control) and FP (floodplain) channel types. In addition, reports by the Alaska Department of Fish and Game state that no sport fish potential exists at any of the project area watersheds. The department also conducts no aerial peak escapement counts for pink or coho salmon in the project area watersheds because the production capabilities are so low. Because of these factors, the level of harvest in the watersheds did not warrant watershed analyses.

Although no watershed analysis was completed, the team did consider risks to water quality and fish habitat. Areas of high concern were removed from consideration in any alternative. (These are discussed in Chapter 3 of this Final EIS, under Watershed and Fish Habitat, Summary of Watershed Conditions.)

#### DEC 2:

Adverse effects to fish habitat have been mitigated through the application of Forest Plan Standards and Guidelines and application of Best Management Practices. As stated in response to DEC Comment 1, areas considered to present a risk to fish habitat were removed from consideration in any alternative. See also the response to DGC Comment 1.

#### DEC 3:

The determination of the optimum silvicultural prescription at the project level is based on site-specific factors (including aesthetics, environmental, biological, engineering, and economic constraints), and will often be influenced by other concerns, such as the difficulty in protecting residual stands through harvest operations on steep slopes, viable sale economics, the desirability of perpetuating spruce, and other forest health concerns (Forest Plan Final EIS, page G-32). The timber standards and guidelines include direction to "Use clearcutting only where such a practice is determined to be the best system to meet the objectives and requirements of Land Use Designations" (1997 Forest Plan, Chapter 4, Timber). The project area is almost entirely within the Timber Management and Managed Landscape LUDs. Goals and objectives for these LUDs are listed in Chapter 1 of the Draft and Final EIS.

The silvicultural prescriptions for all units in the Licking Creek project meet Forest Plan Standards and Guidelines. Partial-cut cable logging increases the logging costs by 40 percent. Clearcuts with reserves meet the requirement for the retention of structure and is cost effective from a timber harvest standpoint.

#### DEC 4:

In all project area watersheds, some harvest units were removed from consideration in any alternative to minimize impacts to fish habitat. Three units in Unnamed Watershed 19 were dropped from the preliminary unit pool. This is discussed in Chapter 3, Watersheds and Fish Habitat, Summary of Watershed Conditions. The units remaining in the watershed were considered to present a lower risk to fish habitat than the dropped units.

#### DEC 5:

While mimicking natural processes may be one factor in determining appropriate silvicultural systems, there are many other site-specific factors that are used in determination of appropriate silvicultural systems. See the response to DEC Comment 3. Even-aged management is one of a range of silvicultural systems permitted under the Forest Plan. The purpose and need of this project is to manage the timber resource to produce saw timber and other wood products from suitable timber lands.

#### DEC 6:

The information on MMI 4 soils presented in Table 3-40 as well as the Unit Card maps in the Draft EIS was generated from our GIS database. This data is used, along with other tools such as aerial photos, to determine the need for site visits to evaluate soil stability, but does not necessarily represent conditions as they are on the ground. An on-site visit by a soil scientist to Unit 22 found MMI 4 soils in the western half of the unit. We deleted this portion of the unit from harvest. During an on-site visit, Unit 1 was not found to contain MMI 4 soils. The southeast corner of Unit 24 was found to include MMI 4 soils during an on-site visit, and this area was excluded from harvest. This information has been updated in the Final EIS. Detailed on-site soil stability reports are located in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record.



**DEC 7:**

The Unit Cards have been revised to clarify the results of our on-site soil stability investigations, and the actions required to protect or avoid problem areas. If selected, this area would be reserved from harvest and counted towards high-value marten habitat deferral, effectively addressing the slope stability concerns while keeping the area as part of the unit. This is in accordance with direction found in the Goshawk and Marten Standards and Guidelines section of the *Tongass National Forest Land and Resource Management Plan Implementation Policy Clarification* (a.k.a. TPIT, 1998).

The Geographic Information System (GIS) is used to generate slopes exceeding 72 percent, as shown on the unit card maps. Because of map scales and other limitations of the technology, GIS analysis produces generalized slope maps that may not precisely locate steep slopes where they occur on the ground. These oversteepened slopes are verified during on-site visits by the soil scientist. On-site findings were recorded in the unit card narration, but not updated in GIS. Therefore, there may be differences in slopes exceeding 72 percent as displayed in the unit card maps and as discussed in the narration. The narration is the most site-specific information and is followed during unit layout.

Where we found soil stability concerns, the areas were either reserved from harvest or yarding recommendations were made to reduce soil disturbance and to protect potentially unstable soils. At least partial suspension is recommended for McGilvery soils (Forest Plan, page 4-84). For detailed soil stability investigation reports, see the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record. Site-specific management recommendations can be found in the Unit Cards in Appendix B of the Draft EIS.

**DEC 8:**

For detailed soil stability investigation reports, see the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record. The soil stability investigation reports address the *Tongass National Forest--Land and Resource Management Plan--Implementation Policy Clarification* (TPIT, 1998) checklist.

**DEC 9:**

Detailed results of on-site soil stability investigations were available as soon as the Draft EIS was published, in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record.

**DEC 10:**

Currently, the LTF at Shoal Cove is designed and permitted for use as either a barge or rafting facility. Our analysis was based on the impacts of rafting logs, which are greater than barging logs. It is important that the Forest Service allow contractors the flexibility to transport logs from the uplands to the water. The timber sale contract does not have language that restricts LTF usage other than for timing. The State of Alaska tidelands permit and Corps of Engineers permit for the Shoal Cove LTF governs the method of log transfer to the saltwater. The Forest Service will continue to offer operators the option of either rafting or barging logs as long as the permits allows both entry systems.

**DEC 11:**

No harvest on slopes greater than 72 percent is permitted in Units 14, 29, 25, 38, or 39, in accordance with Forest Plan Standards and Guidelines. Unit 40 was visited by a soil scientist. The area of concern was removed from the unit and is no longer contained in the unit configuration. Slopes greater than 72 percent remaining in the unit were not of concern for harvest, especially given the low disturbance associated with helicopter yarding. Survey results are in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, available in the project planning record.

**DEC 12:**

An on-site investigation of soil stability in Unit 12 revealed that a majority of the unit (the southern 2/3) was not suitable for harvest. This area was reserved from harvest and counted towards high-value marten habitat reserves, effectively addressing the slope stability concerns while keeping the area as part of the unit. This is in accordance with direction found in the Goshawk and Marten Standards and Guidelines section of the *Tongass National Forest Land and Resource Management Plan Implementation Policy Clarification* (a.k.a. TPIT, 1998).

**DEC 13:**

The results of an on-site soil stability investigation led to the recommendation that the southern 2/3 of Unit 12 be excluded from harvest. Although this area was shown within the unit boundary on the unit card map, it would be excluded from

## Appendix B

harvest as stated in the unit card text (Appendix B of the Draft EIS). This removed the steep, upper (southern) half of the western Class IV stream from harvest. Split yarding or partial suspension is required for the remaining areas of these streams.

By definition, Class IV streams are intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability (Forest Plan page 4-9). The fish biologist and the soil scientist, during field surveys, classified these streams as Class IV, because it was determined that they would not deliver sediment downstream to the Class II stream.

## STATE OF ALASKA

## DEPARTMENT OF FISH AND GAME

## HABITAT AND RESTORATION DIVISION

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Ketchikan Mts. Forest  
 Ranger District  
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TO: Sandy Harbanuk  
 Project Review Coordinator  
 Office of Management & Budget  
 Division of Governmental Coordination  
 Juneau

FROM: Jack Gustafson *JG*  
 Area Habitat Biologist  
 Ketchikan

DATE: January 14, 2003

SUBJECT: NEPA/Preliminary ACMP Comments, Licking Creek Timber Sale DEIS

The Alaska Department of Fish and Game (ADF&G) has reviewed the materials provided by the USDA Forest Service (FS) requesting comments for the Licking Creek Timber Sale Draft Environmental Impact Statement (DEIS). The FS preferred action is to select Alternative 4 (Timber Economics), which would yield approximately 16.8 mmbf of timber. This alternative maximizes logging and road building; it includes cutting about 790 acres of old-growth forest, and constructing approximately 5.5 miles of new road. The action alternative that proposes the least impact is Alternative 2. This alternative minimizes the potential effects to wildlife, watersheds, and other forest values while providing 5.4 mmbf of timber harvest.

*Project Area*

The Licking Creek project area is located on the east side of Carroll Inlet in the south central part of Revillagigedo Island. Although the project includes only a small portion of Carroll Inlet, a dominant landscape-scale feature of the George and Carroll Inlet uplands of central Revilla Island is the extent of clearcut logging which has already taken place on both public and private lands within this area. Much of the land in these inlets is privately owned, and thus is unavailable for public use, access, or the maintenance of wildlife habitats. Much of the surrounding coastal forest habitat has already been clearcut to the beach. Consequently, important high-value habitats for species such as deer, marten, and even bald eagles are limited by past management practices. Such significant losses to these lower-elevation, high-volume old-growth stands and the important wildlife habitats they once provided on south central Revilla Island area are essentially a permanent condition that will persist indefinitely, unless forested lands are eventually allowed to return to an old-growth condition.

The following comments are designed to make known to the extent possible, given the level of information provided, how the ADF&G will proceed to evaluate the Licking Creek Timber Sale for



consistency with the Alaska Coastal Management Program (ACMP) and pursuant to other authorities, such as the National Environmental Policy Act (NEPA), National Forest Management Act (NFMA), and the Fish and Wildlife Coordination Act. We hope the following comments are helpful, and we look forward to working with you as this project progresses toward a decision.

### NEPA/NFMA Issues

#### Secondary and Cumulative Effects

The Forest Service is developing and maintaining an interconnected road system within the project area that significantly contributes to secondary and cumulative impacts. The FEIS should better analyze the potential secondary and cumulative impacts related to road access within the Carroll Inlet area, particularly if closed roads are not permanently "put to bed". Although the DEIS states that all new roads would be closed within 3 years after timber harvest activities are complete (p. 3-20), we are unsure of the extent to which other roads will be closed, or the duration of closures. Additionally, if roads will be closed only temporarily and are reopened for future timber sales or other reasons, they may remain available for future permanent use. This is an appropriate time, therefore, to clarify such concerns and provide a comprehensive analysis that will evaluate the likely outcome of such impacts on fish and wildlife populations inhabiting this portion of Revilla Island. How will vehicular access from the Coast Guard base and Forest Service camps, for example, affect species such as Sitka black-tailed deer and wolf? Will all road construction qualify for the U.S. Army Corps of Engineers silvicultural exemption if non-Forest Service employees, such as the public or personnel from the Coast Guard base, utilize the roads for hunting or recreation?

ADFG-1

ADFG-2

ADFG-3

#### Old-growth Habitat Reserve Strategy

Wildlife Corridors and Old-growth Blocks: Logging and road construction should be avoided in large, high-quality blocks of uncut old-growth forest that are especially high in wildlife values. We appreciate that the small old-growth reserves (OGR) appear to be located and mapped in the project area according to the "Interagency Small Old Growth Habitat Reserve Review" previously finalized. However, less than 1% of the project area is designated as OGR. Additionally, the tendency of the FS generally has been to consider the minimum forest plan requirements regarding size and composition of reserves as the maximum acceptable for implementation, rather than seeking to design reserves to better protect important habitats. To help compensate for this, the FS should seek to maintain corridors between major drainage systems and between OGRs, in addition to protecting other particularly unique or important wildlife habitats not actually included within designated OGRs.

ADFG-4

#### Wildlife Viability Concerns

Band-tailed Pigeons. Coastal band-tailed pigeons occur (and probably breed) in the southern extreme of Southeast Alaska. This proposed timber sale area contains one of the only known locations of breeding behavior activities of band-tailed pigeons documented anywhere on the Tongass National Forest. On June 8, 1998, an interagency team of ADF&G, USFWS, and FS biologists observed approximately four pairs of band-tailed pigeons near the road switchbacks on the north side of the Calamity Creek drainage. This area is now proposed for cutting in Unit 19 of the Licking Creek DEIS. The next year, on July 21, 1999, a small group of band-tailed pigeons was observed by another interagency inspection team (including biologists from the FS, USFWS, and ADF&G) within a couple



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of hundred yards of the sighting the previous summer. The DEIS reports that the sighting of one pair occurred in 2001 near Units 10 and 11, approximately one mile north of Unit 19. A flock of 8-12 birds was also observed on July 23, 2001 south of Calamity Creek (and Unit 19). The exhibition of courtship behavior and site fidelity at this time of year indicates that potential breeding and nesting sites may occur within the project area. Lower Calamity Creek, particularly within the vicinity of Unit 19, would be a logical place to begin searching for this nesting colony in future field surveys. Although band-tailed pigeon nesting on the Tongass is not documented within the literature, we suspect it to occur in some localities within the Ketchikan Ranger District, but perhaps not elsewhere within the Tongass National Forest.

Band-tailed pigeons typically have low productivity, but a high fidelity to forested nesting sites. Research has shown that most immature band-tailed pigeons return as breeding adults to the general area where they were reared (Tacha and Braun, 1994). For the coastal population, which is one of only two populations within North America, these active nesting areas are often located in areas scheduled for timber harvest. Breeding survey data from three studies indicate that coastal band-tailed pigeon populations have declined substantially over the past 15-30 years (Tacha and Brown, 1994). The potential viability risks could be high for Alaska band-tailed pigeons, which appear to reproduce in the extreme southern portion of the Tongass National Forest. If, for example, band-tailed pigeons are not already breeding in areas protected from logging, but lose breeding habitats within areas scheduled for logging, due to their high site fidelity they may not readily colonize or maintain reproduction in the unlogged areas set-aside in old-growth reserves. These potential viability concerns were not addressed within the TLMP Revision because the observations of apparent breeding activity were made after the revision was completed.

ADF&G is concerned that less than 1% of the project area is in designated OGRs, and that unless surrounding OGRs contain traditional colonial nesting sites, the current OGR strategy may be ineffective in protecting band-tailed pigeons. However, without better information it is difficult to know how to redesign appropriate OGRs to achieve this purpose. Adequate surveys and research should be conducted to assure that timber harvest projects such as the Licking Creek project will not risk band-tailed pigeon viability on the Tongass. We recommend that the Forest Service analyze how breeding colonies of band-tailed pigeons can be maintained on the Tongass and provide a professional assessment of viability concerns within the FEIS for this project, followed by monitoring in the Licking Creek project area.

ADFG-5

Reoccupancy of the Licking Creek project area by a colony of band-tailed pigeons is an important first-time-ever opportunity to observe and document the nesting habits of this species in Alaska. At this stage of the review we suggest the establishment of a monitoring program for band-tailed pigeons within this area. This should be accomplished during the up-coming field seasons to determine if band-tails return during future years. To allow the gathering of information to proceed, we request that Units 10, 11, and 19 be deleted from the unit pool in the FEIS of the Licking Creek timber sale.

ADFG-6

We also recommend attempting to find and monitor nesting and habitat use of the Calamity Creek flock of band-tails through a radio-tagging program. If band-tailed pigeons are found to nest within the project area, as appears likely, provisions should be included in the FEIS that will assure the protection of the nesting area so that more information may be obtained over time. Long-term

monitoring could enable the collection of basic data regarding life history and reproduction, which is essential for a better understanding of this species. Because nesting of band-tailed pigeons was unknown during the development of the Forest Plan, protocols should be designed to identify and protect colonial nesting areas and to attempt to monitor this uncommon or rare forest species.

ADFG-6  
cont.

#### *General Wildlife Comments*

Marten. This project area is within a "high-risk" province for marten habitat. In such areas, timber harvest must meet specific forest plan standards and guidelines as outlined in the TLMP revision. For all action alternatives, post-harvest open road densities would be above the recommended maximum densities for marten. Logging has already resulted in a 41% decline in marten habitat capability (pg. 3-16). After this and other existing sales are implemented in the project area, only 59% of the productive old growth (POG) will remain (pg. 3-54). In the Licking Creek project area, 37% of the POG below 1,500 ft. had been harvested by 2002 (pg. 3-52). Another aspect of this concern is that POG includes scrub/muskeg timber down to 8 mbf/acre, and nearly all logging that has occurred thus far in the project area has been in stands of 30 mbf/acre or greater. It will be particularly important to attempt to protect some of the best remaining marten habitat within the project area.

ADFG-7

#### *Information Needs—Coarse Canopy Stand Information*

As seen in the above example regarding marten, ADF&G remains particularly concerned about the disproportionate harvest of rare, coarse canopy, very high volume stands. These high-volume stands occur on only about 2% of the Tongass and are unique plant communities that often represent important high-value wildlife habitat.

The Licking Creek DEIS does not adequately identify coarse canopy/large tree stands in the project area. Unfortunately, most of these stands within the Ketchikan area have already been cut at a rate extremely disproportionate to their occurrence. The lack of site-specific information regarding the location and extent of remaining coarse-canopy, high-volume stands has hampered the ability of biologists and land managers to minimize risks to biodiversity, particularly in landscapes already fragmented by previous logging. As a result, further harvest of these stands raises questions about whether biodiversity on the Tongass is being adequately maintained.

ADFG-8

The FEIS needs to show planned timber harvest in the project area in relation to this rare habitat type. In a letter to former ADF&G Commissioner Frank Rue, dated September 19, 2002, the FS agreed to provide this information for future timber sale reviews. We specifically request that the Caouette Vegetation Structure maps be provided for the project area as part of the Project Clarification, prior to the issuance of the FEIS. In the event that the completion of the vegetative structure maps we are seeking is still pending at the time of the publication of the FEIS, provision of maps showing VC 6 and 7 would be adequate.

#### *Deer Habitat and ANILCA 810 (a) (Subsistence) Issues*

All of the Licking Creek VCU is rated in ADF&G's Tongass Fish and Wildlife Resource Assessment as being in the highest category of "Sensitivity to Disturbance" for subsistence use areas for communities in Southeast Alaska. Additionally, a portion of the project area is within the top 25% of



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VCUs important for deer harvest by residents of Ketchikan, and some of the project area is within the next 25% of VCUs important for deer harvest by residents of Ketchikan. The proposed project has the potential to cause significant and long-term adverse affects to the deer population due to habitat losses and road access.

ADFG-9

The DEIS estimates that, currently, the deer habitat capability within the project area has declined 33% since the beginning of industrial-scale logging in the 1950s. This reduction in deer habitat capability will increase to 39% with the implementation of Alternative 4. Alternative 2, however, results in only one-sixth as much of a reduction of deer habitat capabilities as Alternative 4. The DEIS indicates that it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction on subsistence resources or use in the project area. However, this determination was apparently made under the assumption that the availability of subsistence resources in surrounding areas would not significantly diminish from present conditions, and that future subsistence users might need to look elsewhere and perhaps go further afield to meet such needs. Consequently, the fragmented condition of south central Revilla Island, as described elsewhere in these comments, should be more thoroughly considered in an assessment of meeting demands for future subsistence and other users.

ADFG-10

#### *Other Issues of Concern*

Karst. It is noteworthy that substantial karst features were found in the project area during field reconnaissance, including some highly vulnerable structures such as caves and sinkholes. This is apparently one of the few places on the islands in the local Ketchikan area that contain karst. According to the DEIS all logging and road construction will meet TLMP standards and guidelines for management of karst resources, and will avoid high-vulnerability karst and cave features. We applaud this effort and recommend additional surveys if possible, including fieldwork of the type that would explore the potential for any unique biological resources that may be found in caves or sinkholes on this part of the Tongass National Forest. We are particularly interested in learning if some of these karst features may provide habitat for the Keen's bat (*Myotis keenii*), a species that is rare on the Tongass and elsewhere within the Pacific Northwest (Parker and Cook, 1996).

ADFG-11

Market Demand and Project Alternatives. Based on FS figures, it is our understanding that there is currently uncut timber inventory for which NEPA analysis is completed of approximately 635 mmbf on FS lands. These include areas that have volume currently under contract that has been sold but remains uncut (300 mmbf), plus sales with NEPA decisions issued but not yet under contract (163 mmbf), plus another 172 mmbf with FEISs completed, but no RODs. It is also our understanding that due to current market conditions and other factors, approximately 48 mmbf and 34 mmbf were cut in 2001 and 2002, respectively. Consequently, current demand (as measured by the rate of cutting over the past two years) for FS timber cut within SE Alaska could allow the backlog of the NEPA-completed timber supply to potentially last for another 15 years. Excluding the FEISs that have been completed, but do not yet have RODs, the supply could last for over 11 years.

ADFG-12

Furthermore, we also understand that in the recent 5-year average, approximately 30% of Tongass National Forest timber has been exported in the round, therefore not contributing to local employment by being processed within Alaska. If this component of the timber supply was no longer exported,

local demand could be increased by one third as much without impacting the existing "timber pipeline." Based on current supply and demand figures, and other considerations, ADF&G believes that an alternative with less resource impact than Alternative 4 should be more seriously considered as a preferred alternative in the Licking Creek FEIS and ROD.

Monitoring of Timber Availability, Falldown, and Long-term Sustained Yield. It is important for the FS to verify that the actual suitable timberland component estimated in TLMP matches what is eventually found to be available within individual project level analyses. In the past, the failure of project-level timber availability to meet forest-wide projections has resulted in artificially accelerated rates of timber harvest and excessive, unpredictable habitat losses. We recommend that the Licking Creek FEIS discuss, and also display in table form, TLMP's estimated projections regarding timber availability and operability in this project area and compare this to the information collected in the field for this project level review. A thorough site-specific analysis of this type, followed by the collection of additional post-harvest monitoring data, will be very helpful in assessing the accuracy of this important aspect of TLMP.

ADFG-13

If project-level timber supply falldown continues under the implementation of the Tongass Plan Revision, it should alert the FS that the more generalized timber supply estimates might be unattainable. This has significant implications regarding the sustained yields of old growth-dependent wildlife upon which subsistence and other hunters depend, as does the tourism industry. With the establishment of a well-designed monitoring program, along with timely feedback to improve field-verified databases, other agencies and the public can be assured that expectations for achieving the assumed timber harvest levels are sustainable over the long-term.

Mid-level Project Planning. Our concerns regarding this particular timber sale go beyond the boundaries of the project area and extend further in time than is being considered in the analysis of this EIS. Individual timber sales become much more problematic when cumulative impacts are considered on a landscape-level scale and over the course of the rotation, as opposed to being reviewed in a limited perspective that basically squeezes time to the present and space to project area boundaries.

In the past, mid-level planning efforts were a way to attempt to bridge the gap between a forest plan that extended from this portion of the southernmost Tongass to Yakutat Bay in the Gulf of Alaska. The FS no longer appears to be engaging in mid-level planning efforts, and future management problems may arise because of the lack of such planning. Our department will likely encounter certain very difficult, large-scale, and persistent future management problems in Southeast Alaska, especially in areas that have been heavily fragmented by logging and associated significant habitat losses. These problems include future unsustainable levels of deer harvest, significant possibilities of significant restrictions of subsistence use of deer, limitations/exclusions of non-rural hunters from large areas of previous use, and probable future demands for wolf control in southern Southeast Alaska as hunters begin to be restricted from the taking of deer.

ADFG-14

In addition to concerns for maintaining adequate deer for human hunters, as wolves are eradicated from portions of their range (e.g., Gravina Island, Cleveland Peninsula, etc.) and as their population declines continue due to road construction, habitat loss, and reduced prey availability, there will



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probably also be increased pressure to maintain deer for wolves, a species the USFWS recognized as having serious viability concerns under the less-protective 1997 TLMP. How can we, for example, adequately conserve deer to maintain wolf viability while at the same time meet the needs and demands of subsistence and non-rural hunters? By taking a more conservative approach now, some of these potential concerns could be better addressed in the future.

#### PRELIMINARY ACMP CONSISTENCY ISSUES

##### Preliminary ACMP Comments.

Section 206.C. of the ACMP MOU indicates that "State comments shall endeavor to include a separate "Preliminary ACMP Comments" section that will consist of ACMP comments and related applicable ACMP standards and policies."

##### Standards Used.

The DEIS states (page I-13):

*The Alaska Coastal Management Program incorporated the Standards and Guidelines of the Alaska Forest Resources and Practices Act (AFRPA) of 1979 for timber harvesting and processing...*

We wish to clarify that the ACMP [6 AAC 80.100] wording is as follows:

*TIMBER HARVEST AND PROCESSING. AS 41.17, Alaska Forest Resources and Practices Act, and the regulations and procedures adopted under that chapter with respect to the harvest and processing of timber, are incorporated into the Alaska coastal management program and constitute components of the coastal management program with respect to those purposes."*

The Alaska Forest Resources and Practices Act (FRPA) and corresponding Regulations (FRPR) constitute the ACMP standards for federal timber sales. The pertinent standards applicable for evaluating whether the Licking Creek Timber Sale is consistent with the ACMP for the management of fish and wildlife resources are summarized in the paragraphs below. Although the FRPA standards cited reference state forest land, Section 41.17.900. APPLICABILITY specifies:

*(b) For federal land,*

- (1) the degree of resource protection may not be less than that established by this chapter for state land except that AS 41.17.119 establishes the minimum riparian standard;*
- (2) a timber harvest activity subject to this chapter shall satisfy the requirement to be consistent to the maximum extent practicable with the Alaska coastal zone management program if the federal land management plans, guidelines, and standards applicable to that timber harvest activity provide no less resource protection than the standards that are established in this chapter provide for state land except that*
  - (A) AS 41.17.119 establishes the minimum riparian standards;*

In December 1993, the State Attorney General carefully analyzed the entire FRPA as it relates to ACMP reviews of riparian harvest under federal timber sales and concluded:

*The riparian zones must be at least 100 feet, and there must also be a determination that within 100 to 300 feet, the federal requirements for the harvest are at least as restrictive as the state requirement that within 100 to 300 feet the activity is "consistent with the maintenance of important fish and wildlife habitat." AS 41.17.118(a)(2)(B).*

Therefore, the sections of the FRPA (and by incorporation, applicable regulations from the FRPR) noted below, for example, are part of the ACMP standards for federal timber sales (underlines added):

*AS 41.17.060. REGULATORY AND ADMINISTRATIVE STANDARDS.*

- (b) With respect to state, municipal, and private forest land, the following standards apply:*
  - (5) significant adverse effects of soil erosion and mass wasting on water quality and fish habitat shall be prevented or minimized.*
- (c) With respect to state and municipal forest land only, the following standards also apply:*
  - (1) forest land shall be administered for the multiple use of the renewable and nonrenewable resources and for the sustained yield of the renewable resources of the land in the manner that best provides for the present needs and preserves the future options of the people of the state;*
  - (3) to the extent its capacity permits, forest land shall be administered so as to provide for the continuation of businesses, activities, and lifestyles that are dependent upon or derived from forest resources,*
  - (5) there may not be significant impairment of the productivity of the land and water with respect of renewable resources;*
  - (7) allowance shall be made for important fish and wildlife habitat.*

*AS 41.17.118. RIPARIAN STANDARDS FOR STATE LAND.*

- (a) The riparian standards for state lands are as follows:*
  - (2) on state forest land managed by the department that is located south of the Alaska Range,*
    - (A) harvest of timber may not be undertaken within 100 feet immediately adjacent to an anadromous or high value resident fish water body;*
    - (B) between 100 and 300 feet from the water body, timber harvest may occur but must be consistent with the maintenance of important fish and wildlife habitat.*

*AS 41.17.119. MINIMUM RIPARIAN STANDARDS FOR OTHER PUBLIC LAND. On other public land, harvest of timber may not occur within 100 feet from the shore or bank of an anadromous or high value resident fish water body that is located south of the Alaska Range;*

In addition, please note that the FRPA was amended in 1990 and again in 1999, and the FRPR was amended in 1993 and 1999. Therefore, the FPRA and FRPR, as amended, constitute the ACMP standard for review of federal timber sales. It will be important for the Licking Creek Timber Sale NEPA documents to clearly show that the FRPA standards are met or exceeded so that the ADF&G may adequately review the document for consistency with the ACMP. Project components requiring multiple agency permits, such as log transfer facilities (LTFs), floating camps, or water withdrawals, are subject to broader range of ACMP standards including the habitat standards. These standards protect aquatic, marine, and important upland habitats and uses. Additional preliminary ACMP comments follow.

*Information Needs*

We specifically request that Caouette Vegetation Structure maps, or at least maps showing VC



6 and 7 stands, be provided for the project area as part of the Project Clarification. These maps reflect stand structural attributes by drawing on existing forest inventory GIS layers such as aspect, soils, and tree size and density. The maps display vegetation structure in a way that provides the highest probability of identifying rare forest features and unique habitat types such as very high volume stands, which are especially valuable to some old-growth species. In a letter to former ADF&G Commissioner Frank Rue, dated September 19, 2002, the FS has agreed to provide this information for timber sale reviews.

Other information needs can be best met through preparation and submission of near-final road and unit cards, including the respective resource specialists' reports. These cards must clearly show stream classifications, buffer locations and sizes, and road maintenance and closure plans to prevent nonpoint source sedimentation that can lead to deterioration of anadromous and resident fish surface waters. Also included should be clear delineation of which roads are planned for active, inactive, and closed status, because each category has specific maintenance criteria in the FRPA and regulations.

#### *Title 16 Issues*

As detailed in Section 402 of the ACMP MOU, in addition to the procedural and information exchange requirements specified under the MOU, the *FS-ADF&G Supplemental MOU No. 1 Regarding Fish Habitat and Passage* (T16 MOU) applies to all instream activities associated with projects reviewed under the MOU. The MOU indicates that after completion of an ACMP consistency review for a project involving instream activities, the FS will fulfill the procedural requirements of the T16 MOU prior to conducting any instream activities. Through the Notice of Instream Activity (NOIA) process, ADF&G anticipates early notification and the opportunity for early review of proposed instream activities during a project's preliminary design phases.

Stream Crossings Proposed. Due to the current road network already in place and the steepness of the terrain to access existing uncut timber, there may be no new Class I stream crossings associated with project activities. There are, however, two bridges and one culvert that will need to be reconstructed at Class II streams. As more information is developed, we anticipate that the review and installations of these structures will occur pursuant to our MOU regarding such activities.

Existing Structures. Additionally, we are concerned about any existing structures that may be impediments to fish passage. The 2001 TLMP monitoring report indicates that approximately 34% of existing Class I and 71% of existing Class II fish habitat crossings do not meet current fish passage standards (pg. 3-36). The DEIS indicates that, within this particular project area, there may be approximately 12 structures on resident fish streams that may impede fish passage. The results of the 2002 field surveys were apparently unavailable at the time the DEIS went to the printer and may still be pending. We would anticipate, however, that this information would become available soon and that this section of the fisheries analysis would be updated within the FEIS.

#### *Roads and Access Management*

Related to the road condition information, we also have concerns that the construction of new roads

may impact water quality and fish habitat in the project area. Construction of additional road networks can lead to negative effects on wildlife populations as a result of increased access and increased secondary effects such as non-point source sediment loads in surface waters. The addition of new roads makes it even more difficult to keep pace with the level of road maintenance that is now necessary with the existing road system.

#### *Monitoring*

Timber Availability, Falldown, and Long-term Sustained Yield: The issues concerning timber availability, falldown, and the long-term sustained yield of all forest resources and outputs are described previously in the NEPA section of these comments. These concerns are, however, also pertinent to Sec. 41.17.060(c)(1, 3, 5, and 7) and 11 AAC 95.185(a) and (e) of the Alaska Forest Resources and Practices Act (FRPA) and Regulations, and the state's ACMP review of this project.

#### *Important Fish and Wildlife Habitats*

"Important wildlife habitat" was described in the August 26, 1996, State TLMP comments, and includes, but is not limited to, concentration areas for feeding, denning, resting, travel, breeding, rearing, molting, spawning, wintering, and birthing, and areas used by species in a population decline or that are environmentally sensitive. Riparian areas are important wildlife habitat for feeding, nesting, molting, travel, and denning, as well as routes for maintaining connectivity among the upper reaches of watersheds.

AS 41.17.060 Concerns: Protection of Important Wildlife Habitats. Some primary issues relating to wildlife habitat that are of most concern to ADF&G include cumulative and secondary impacts, the locations of old-growth reserves, and various issues relating to goshawks, marten, black bear, wolves and deer. Concerns regarding wolves and deer relate primarily to loss of old-growth forest habitat as well as road densities and access management issues. Field surveys and analyses need to be accomplished to assure protection of important wildlife habitats within the project area. Attention should also be given to better provide for both consumptive and non-consumptive uses of wildlife.

Wildlife Corridors and Old-growth Blocks. Logging and road construction should be avoided in large, high-quality blocks of uncut old growth that are especially high in wildlife values. Less than 1% of the project area is designated as Old-growth Habitat Reserve lands. The FS should seek to maintain corridors between major drainage systems and between OGRs, in addition to protecting other particularly unique or important wildlife habitats not actually included within designated OGRs.

Band-tailed Pigeons. As detailed in the NEPA/NFMA section of these comments, coastal band-tailed pigeon populations are of particular concern for ADF&G with respect to this proposed timber sale. The observation by biologists of courtship behavior and site fidelity indicates that potential breeding and nesting sites may occur within the project area, one of the only known locations of breeding band-tailed pigeons on the Tongass National Forest. Potential viability risks for Alaska-breeding band-tailed pigeons, which appear to reproduce in the extreme southern portion of the Tongass National Forest, could be high. Because less than 1% of the project area is in designated OGRs, the current OGR strategy may be ineffective in protecting band-tailed pigeons. Adequate surveys and research



Sandy Harbanuk

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January 14, 2003

should be conducted to assure that timber harvest projects such as the proposed Licking Creek sale will not risk band-tailed pigeon viability on the Tongass. We recommend that the Forest Service analyze how breeding colonies of band-tailed pigeons can be maintained on the Tongass and provide a professional assessment of viability concerns within the FEIS for this project, followed by monitoring in the Licking Creek project area.

Reoccupancy of the Licking Creek project area by a colony of band-tailed pigeons is an important first-time-ever opportunity to observe and document the nesting habits of this species in Alaska. We suggest the establishment of a monitoring program for band-tailed pigeons within this area, which should be accomplished during the up-coming field seasons to determine if band-tails return during future years. To allow the gathering of information to proceed, **we request that Units 10, 11, and 19 be deleted from the unit pool in the FEIS of the Licking Creek timber sale.** We also recommend attempting to find and monitor nesting and habitat use of the Calamity Creek flock of band-tails through a radio-tagging program. If band-tailed pigeons are found to nest within the project area, as appears likely, provisions should be included in the FEIS that will assure the protection of such a nesting area so that more information may be obtained over time.

Deer Habitat and Subsistence Issues. All of the Licking Creek VCU is rated in ADF&G's Tongass Fish and Wildlife Resource Assessment as being in the highest category of "Sensitivity to Disturbance" for subsistence use areas for communities in Southeast Alaska. Additionally, a portion of the project area is within the top 25% of VCUs important for deer harvest by residents of Ketchikan, and some of the project area is within the next 25% of VCUs important for deer harvest by residents of Ketchikan. The proposed project has the potential to cause significant and long-term adverse affects to the deer population due to habitat losses and road access.

The DEIS estimates that, currently, the deer habitat capability within the project area has declined 33% since the beginning of industrial-scale logging in the 1950s. This reduction in deer habitat capability will increase to 39% with the implementation of Alternative 4. Alternative 2, however, only results in one-sixth as much of a reduction of deer habitat capabilities as Alternative 4. The DEIS indicates that it is not expected that project-related or reasonably foreseeable future activities would cause a significant possibility of a significant restriction on subsistence resources or use in the project area. However, this determination was apparently made under the assumption that the availability of subsistence resources in surrounding areas would not significantly diminish from present conditions, and that future subsistence users might need to look elsewhere and perhaps go further afield to meet such needs. Consequently, the fragmented condition of south central Revilla Island, as described elsewhere in these comments, should be more thoroughly considered in an assessment of meeting demands for future subsistence and other users.

As noted in the NEPA/NFMA comments section, our concerns regarding this particular timber sale go beyond the boundaries of the project area and extend further in time than is being considered in the analysis of this EIS. Individual timber sales become much more problematic when cumulative impacts are considered on a landscape-level scale and over the course of the rotation. Our department will likely encounter certain very difficult, large-scale, and persistent future management problems in Southeast Alaska, especially in areas that have been heavily fragmented by logging and experienced significant habitat losses. Potential problems include future unsustainable levels of deer harvest,

Sandy Harbanuk

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January 14, 2003

significant possibilities of significant restrictions of subsistence use of deer, limitations/exclusions of non-rural hunters from large areas of previous use, and probable future demands for wolf control in southern Southeast Alaska as hunters begin to be restricted from the taking of deer. By taking a more conservative approach now, some of these potential concerns could be better addressed in the future.

There are a number of good reasons for the FS to seriously consider Alternative 2 as the preferred alternative. In the short-term, Alternative 2 does not add road miles to an already over-extended road maintenance program. Also, of all of the action alternatives, it has the fewest acres of clearcuts in an already significantly impacted and severely fragmented landscape, and it has the least detrimental effects on wildlife and human use of wildlife within the project area. There is also a significant existing backlog of wood available that may meet demand for several years into the future, calling into question the need to select the maximum timber harvest alternative. In the long-term, our management options for working with complex resource and social problems may be significantly broadened by maximizing the range of alternatives available. Consequently, to better balance timber needs and costs, habitat losses and wildlife concerns, and other public needs and values of the forest, we recommend that the FS select Alternative 2 instead of Alternative 4.

Thank you for the opportunity to provide comments on this proposed timber sale.

cc: Moira Ingle, ADF&G, H&R, Douglas  
 Don House, ADF&G, CFM&D, Douglas  
 Mike Turek, ADF&G, Sub., Douglas  
 Boyd Porter, ADF&G, Ketchikan  
 Kim Titus, ADF&G, Douglas  
 Kevin Hanley, ADEC, Juneau  
 Chris Meade, EPA, Anchorage  
 Ed Grossman, USFWS, Juneau  
 Steve Brockmann, USFWS, Ketchikan  
 Jerry Ingersoll, USDA-FS, Ketchikan  
 Tom Puchlerz, USDA-FS, Ketchikan  
 P. Michael Payne, NMFS, Juneau

#### LITERATURE CITED

- Tacha, T.C. and C.E. Braun. 1994. Migratory shore and upland game bird management in North America. International Association of Fish and Wildlife Agencies. Allen Press, Lawrence, Kansas. Pg. 61-74.
- Parker, D.I. and J.A. Cook. 1996. Keen's Long-eared Bat, *Myotis keenii*, confirmed in southeast Alaska. Canadian Field-Naturalist 110(4): 611-614.



**Response to State of Alaska Department of Fish and Game:****ADFG 1:**

The Licking Creek Draft EIS and Final EIS discuss travel access management in Chapter 3, Issue 4: Transportation, Access Management. Additional information concerning access management for specific roads may be found in Appendix B of the Draft EIS (Road Cards). In these sections we discuss the access management of roads used in the Licking Creek alternatives. Since all new roads would be closed to motorized traffic after the project is completed and silvicultural certification has been accomplished, road densities in the project area would not be increased; however, existing access would be increased for foot traffic. Effects from roads on wildlife species such as deer, marten, and wolf are discussed in the Issue 3: Wildlife section of the Draft EIS and Final EIS.

The Licking Creek EIS is supported by the Forest Level Roads Analysis Process (RAP) and the North Shoal Cove Project-level RAP. The primary objective of the North Shoal Cove Roads Analysis Process is to provide information to develop a road system that is safe and responsive to public needs and desires, is affordable and efficiently managed, has minimal negative ecological effects on the land, and is in balance with available funding for needed management actions. This analysis has been completed and is available in the project planning record.

**ADFG 2:**

There would be an increase in activity during project implementation, but since new classified roads would be closed after completion of harvest and silvicultural activities, the impact to species would return to a condition similar to the existing condition. Impacts of road use on wildlife are discussed in this Final EIS in Chapter 3, Issue 2: Wildlife under Effects of Prior Road Construction, Road Impacts on Wolves, and Road Impacts on American Marten.

**ADFG 3:**

The Forest Service has an extensive system of roads that are authorized, constructed, and maintained for ongoing traffic. The predominant usage of most of these roads on the Tongass National Forest is for silvicultural uses such as firewood gathering, access to free-use timber (36 CFR 223.10), or ongoing management of the stands of trees. While acknowledging that some incidental uses of the roads by the public at large may be for other purposes, the sole purpose of the construction of the road is for silvicultural purposes.

In a letter dated March 12, 1998 from the U.S. Army Corps of Engineers regarding roads on the Sea Level project, the Corps concurred that the project roads appear to meet the criteria for the silvicultural exemption, if the roads are constructed and/or maintained for the purpose of silvicultural activities and would not be managed for recreation or other public use. These roads are constructed to the minimum standard needed for the silvicultural purposes, including minimization of adverse effects on the aquatic environment during construction. If the road would be constructed to more than minimal silvicultural specifications (e.g., width and length) to accommodate more than incidental public use, the Forest Service would apply for a Section 404 permit.

Roads used by Forest Service and contract personnel would be limited by the Access Management categories listed in the Final EIS in Chapter 3, Issue 4: Transportation section, under Access Management. All new roads in the Licking Creek project would be built and maintained for silvicultural purposes and then closed, and therefore would meet the silvicultural exemption from a Section 404 permit.

**ADFG 4:**

Old-growth Reserves are designated by VCU, not by project area. The Forest Plan (Appendix K, Old-growth Habitat Reserve Criteria) requires that 16 percent of each VCU be in small Old-growth Reserves. The small OGR in VCU 7460 is described in Chapter 3 of this Final EIS in the Biodiversity and Old Growth section. The small OGR was reviewed by an interagency team of biologists as part of the Sea Level Timber Sale EIS. Representatives of the USFWS and ADF&G agreed that the OGR in this VCU met the criteria described in Appendix K of the Forest Plan, and that no additional review is required for the Licking Creek project (T. Woods, USFWS and J. Gustafson, ADF&G, concurrence letters 2001).

The Licking Creek project area lies entirely within the previous Sea Level project boundary. The Small Old-growth Habitat Reserves and the landscape connectivity were examined under the Sea Level EIS and adjustments made as necessary. This larger area consisted of several VCUs, which met the landscape scale required by the Forest Service (Forest Plan Wildlife XVIII, A.1. p. 4-120). The OGR strategy for the Forest is meant to be used as a coarse filter to maintaining viability across the entire Forest. There is no specific requirement to ensure connectivity between all small reserves or between small

## Appendix B

reserves and non-development LUDs, however, the 1,000-foot beach fringe buffer is designed to provide connectivity (Forest Plan Beach I, A.4. p. 4-4). The Licking Creek project area is adjacent to the Misty Fiords National Monument to the east, a semi-remote recreation area to the north.

### ADFG 5:

Band-tailed pigeons are not listed as a threatened or endangered species anywhere in their range, and are not listed as a sensitive species by the Alaska Region. They are also not covered on the list of migratory birds to monitor in Alaska. Although band-tailed pigeons have been seen during the breeding/nesting season, no nests have been located during repeated surveys. Additional surveys are being conducted in Spring 2003. We propose to monitor the area for 3 years post-harvest to determine whether or not the birds return to the area and continue to exhibit behavior consistent with breeding.

Viability is a Forest-wide issue. A mid-point review of the Forest Plan is beginning and any changes that are seen as critical will be made during this review or during the next revision of the Forest Plan.

### ADFG 6:

Although band-tailed pigeons have been seen during the breeding/nesting season, no nests have been located during repeated surveys. Additional surveys are being conducted in Spring 2003. We propose to monitor the area for 3 years post-harvest to determine whether or not the birds return to the area and continue to exhibit behavior consistent with breeding. Dropping units from the proposed action at this time is not warranted.

A mid-point review of the Forest Plan is beginning and any changes that are seen as critical will be made during this review or during the next revision of the Forest Plan.

### ADFG 7:

Page 3-22 of the Draft EIS references a paper by Suring, et al (1992) for the road density figures given, not a Forest Plan Standard and Guideline. The Standards and Guidelines in the Forest Plan do not require a specific road density in marten areas. The Standards and Guidelines state that if "...road access has been determined...to significantly contribute to unsustainable marten mortality, implement effective road closures...and develop and implement road management objectives..." Current marten harvest levels in the project area are low and should not increase significantly due to the isolation of the project area. Beach buffers are of high importance to marten and are protected by Standards and Guidelines, along with riparian areas. The prescriptions for all units with high-value marten habitat leave the required structure as called for in the Standards and Guidelines of the Forest Plan. Both the Silviculture and Wildlife sections of the Unit Cards (in Appendix B of the Draft EIS) list these prescriptions if the unit includes high-value marten habitat.

### ADFG 8:

In the letter to former ADF&G Commissioner Frank Rue, dated September 19, 2002, the FS agreed to provide information on volume classes 6 and 7 for timber sale environmental documents. Volume classes 6 and 7 provide the best available estimate of high-value old growth (coarse-canopy stands; Caouette, et. al., 2000). Approximately 11 percent (about 539,000 acres) of the productive old growth on the Tongass is mapped as high-volume, coarse-canopy (Forest Plan Final Supplemental EIS, page 3-44). Tables 3-25 and 3-35 in the Licking Creek Final EIS display the number of acres of volume classes 6 and 7 proposed for harvest by alternative. A map that displays the location of volume classes 6 and 7 in the project area is in the project planning record and is available upon request.

### ADFG 9:

We have corrected our estimates to reflect deer densities per square mile in critical winter habitat (below 1500 feet in elevation), and the resulting densities are substantially higher than those reported in the Draft EIS. All alternatives would maintain habitat capability at a minimum of 30 deer per square mile at the project area level and 26 deer per square mile at the WAA level (Table 3-6 in Chapter 3 of the Final EIS). This is well above the density of 18 deer per square mile needed to support wolf predation and hunter demand (Annual Monitoring Report for FY 2000), and is expected to be adequate to support both subsistence and non-rural (Ketchikan) hunting pressure for the foreseeable future. Combined subsistence and non-rural hunters took 94 deer per year from 1996-2001, which is 3 percent of habitat capability. A deer population at carrying capacity should be able to support a hunter harvest (demand) of 10 percent to be sustainable and provide a reasonably high level of hunter success. (See the Subsistence section in Chapter 3 of this Final EIS.)



**ADFG 10:**

Subsistence use is generally examined at the Wildlife Analysis Area (WAA) level, which incorporates a larger area beyond the project area boundary (see Figure 3-6 in Chapter 3 of the Final EIS). Consultation with local subsistence communities indicates that the Carroll Inlet area (WAA 406 and Licking Creek project area) is little used by subsistence users. We contacted the three federally recognized tribal governments and traditional tribal representatives in the area prior to preparation of the Draft EIS and held a subsistence hearing for this project between the Draft and Final EIS. All comments and testimony indicated that the area is not of high concern among subsistence users. The forecasted deer densities for the project area and WAA are expected to be adequate to support both wolf predation and increases in subsistence and non-rural harvest (see response to ADFG Comment 9).

Connectivity was examined for the Sea Level EIS. A few corridors were identified to the south of the project area. The Licking Creek project area lies entirely within the previous Sea Level project boundary and we did not do a second analysis for this project.

**ADFG 11:**

Species are prioritized for survey by their respective level of legal protection and concern in the Forest Plan. Karst features receive protection under the Standards and Guidelines of the Forest Plan, and therefore, species associated with those features were a lower priority than other species that were surveyed more thoroughly for this project.

**ADFG 12:**

There is currently 226 MMBF under contract to timber operators on the Tongass. Of this volume, 33 MMBF is uneconomical to harvest under current market conditions, and until recently, 65 MMBF was under court-ordered injunction, pending completion of the Forest Plan Supplemental EIS. An additional 65 MMBF was recently returned to the Forest Service by Gateway Forest Products. Approximately 193 MMBF is currently under contract that is economical and available during 2003. Current market demand for the Tongass has been calculated to be 151 MMBF for 2003; see Appendix A of this document. Timber harvest in the past 2 years has been at its lowest level since 1954 (when timber harvest became a major component of the economy in this area), due to a number of factors including low market conditions, increased costs of harvest and road building, the Roadless Area Conservation Rule, and legal challenges.

Current market demand and project economics will be considered by the decision maker in selecting an alternative, along with other factors such as environmental effects on other resources.

**ADFG 13:**

The Forest Plan projections of suitable and available timber are used as a base and then updated during project-level analysis. Estimates of acres of National Forest System lands within the Licking Creek project area that are available and suitable for timber harvest are displayed in Tables 3-30, 3-31 and 3-32, in the Silviculture and Timber Management section of Chapter 3 of the Draft and Final EIS.

Verifying the accuracy of the Forest Plan's projections, such as you recommend, is part of Validation Monitoring. This is appropriately done as part of the mid-term review of the Forest Plan, which is currently underway. Chapter 6 of the Forest Plan describes the Monitoring and Evaluation that is to take place during implementation of the Forest Plan, and includes Implementation, Effectiveness, and Validation monitoring. Monitoring results are given in the *Tongass National Forest Annual Monitoring and Evaluation Reports* for each fiscal year. We will forward this comment to that review process.

**ADFG 14:**

Project-level analyses address the cumulative effects of reasonably foreseeable future projects, such as those listed in the Ten Year Schedule of Timber Sales. The Forest Plan Final EIS addressed effects to the end of rotation on deer habitat. In addition, we calculated the potential effects of the Licking Creek project on deer habitat to the end of rotation; this information is in the Wildlife Resource Report and is available upon request.

Some mid-level landscape scale analysis was included in the Licking Creek EIS. Connectivity (fragmentation and corridors) and snag density are recommended to be analyzed at the landscape scale (Forest Plan Standards and Guidelines, Wildlife XVIII.A.2, page 4-120). This analysis was done for the Sea Level Timber Sale EIS project area, which consisted of several VCUs. The Licking Creek project area lies entirely within the previous Sea Level project boundary, and the Licking Creek EIS incorporated the Sea Level analysis by reference. In addition, a large landscape scale, the WAA, was used to analyze changes to deer habitat capability and road density impacts to wolves. For the reasonably foreseeable future, deer densities

## Appendix B

are predicted to be able to support both wolf populations and subsistence and non-rural hunting pressure in WAA 406, which includes the Licking Creek project area. See also response to ADFG Comment 9.

# Alcan Forest Products

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RECEIVED

DEC 1 2002

Ketchikan-Misty Fjord  
Ranger District

December 16, 2002

Jerry Ingersoll, District Ranger  
Attn: Licking Creek  
3031 Tongass Ave.  
Ketchikan, AK 99901

Dear Mr. Ingersoll,

Please accept Alternative 4 for the Licking Creek Record of Decision. It appears that it has the best chance of making an economic timber sale from this area. This is a good area to get timber production now and in the future.

Sincerely,



Brian Brown

Alcan-1

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111 Stedman Street, Suite 100 Ketchikan, AK 99901  
Telephone: 907 225 1710 Facsimile: 907 225 1709  
Cell : Brian Brown 907 723 1768 Eric Nichols 907 209 66565  
Email: alcantimber@kpunet.net

## Appendix B

### **Response to Alcan Forest Products:**

#### **Alcan 1:**

Project economics will be considered by the decision maker in selecting an alternative, along with other factors such as environmental effects on other resources.



## Here are my comments for the Licking Creek Timber Sale:

Name: ARNE PIHL  
 Organization: (official representation only) Self  
 Address: 4326 So Tongass Hwy  
 City, State, Zip: Ketchikan, AK 99901

Maintain roads for recreational access to alpine hiking areas and deer alpine habitat. I am personally opposed to removal of culverts after sale term as many roads are access to many recreational opportunities.

Pihl-1



Received at  
 Open House  
 Jan 7, 2003

Please mail to:

District Ranger, Ketchikan Ranger District/Misty Fiords National Monument, Tongass National Forest,  
 Attn: Licking Creek Timber Sale, 3031 Tongass Avenue, Ketchikan, AK 99901

Telephone: (907) 225-2148 FAX: (907) 225-8738 E-Mail: [ksococonnor@fs.fcd.us](mailto:ksococonnor@fs.fcd.us)

Licking Creek Timber Sale

## Appendix B

### Response to Arne Pihl:

#### Pihl 1:

In general, the Road Management Objectives for the entire Licking Creek Timber Sale EIS provide for recreational opportunities and resource protection by reconstructing and repairing roads. When classified roads are closed to motorized traffic (after timber harvest and silvicultural activities), the roads are left so that recreational access is restricted no more than necessary.

On each road card (Appendix B of the Draft EIS) are two Sub-headings, **Maintenance Criteria** and **Operational Criteria**.

Under **Maintenance Criteria**, the Objective Maintenance Level displays how the Forest Service intends to maintain the road in the future, after timber harvest and silvicultural activities are completed. Maintenance Levels 1, 2, and 3 are defined in the Transportation section of Chapter 3.

Under **Operation Criteria**, the Travel Management Strategies explain what type of vehicles will be able to use the road after harvest and silvicultural activities are completed.

The Objective Maintenance Level and Travel Management Strategies are derived from 1) the type of road (i.e. Arterial, Collector, Local, or spur), 2) future needs of the road for timber production and access for recreational opportunities, 3) cost and availability of maintenance, which can be very high and/or unavailable, and 4) public and agency input, which currently is protective of the resources.

When all of these items are considered, the result has been to close Local designated roads to motorized vehicles, but to leave them open for non-motorized use. We do this by removing culverts (which are costly to maintain), "laying back" the slopes, and constructing water bars at obtuse angles. The cross-drains are still functional, and can be crossed by hikers, bicycles and off-road vehicles.

*Center for Biological Diversity  
Sitka Conservation Society  
Wilderness Society*

RECEIVED

JAN 23 2003

Ketchikan-Misty Fjords  
Ranger District

Jerry Ingersoll, District Ranger  
Attn: Licking Creek  
3031 Tongass Ave.  
Ketchikan, AK 99901

January 20, 2003

**Comments on the Licking  
Creek Timber Sale**

Dear Mr. Ingersoll,

The following comments regarding the Licking Creek Timber Sale Draft Environmental Impact Statement (DEIS) are submitted on behalf of the Center for Biological Diversity and the Sitka Conservation Society.

The Center for Biological Diversity (the Center) is dedicated to protecting native wildlife and wildlife habitat. The Center has been involved with issues regarding the Tongass National Forest since 1994 when it filed petitions to protect the Queen Charlotte goshawk and the Alexander Archipelago wolf under the Endangered Species Act. These petitions played a crucial role in the development of the Tongass Land Management Plan (TLMP) in regards to the creation of the habitat reserve system and the adoption of standards and guidelines designed to specifically protect sensitive species. The Center is still involved in active litigation over the fate of the goshawk, and continues to follow the fate of the wolf and many other species that depend upon the Tongass.

The Sitka Conservation Society (SCS) was formed in 1967. Over several decades SCS has participated in the Tongass Land Management Plan (TLMP) revision process and in the decision making process for many Tongass timber projects. SCS is a litigant in the challenge to the Forest Service's failure to consider potential lands for wilderness

designation. SCS has also fought to identify and protect species threatened by extinction, and has participated in litigation to list the Queen Charlotte goshawk as an endangered species.

The Wilderness Society (TWS), founded in 1935, is a non-profit membership organization devoted to preserving wilderness and wildlife, protecting America's prime forests, parks, rivers, deserts, and shorelines, and fostering an American land ethic. With 200,000 members nationwide, TWS has approximately 676 members in Alaska, many of whom use the Tongass National Forest and are concerned about the management of its natural resources and wild areas.

**The Purpose and Need for this Sale is unjustified.**

The Licking Creek DEIS lists four goals and objectives for this project. All of these exclusively relate to timber demand, economics, and timber industry jobs for southeast Alaska. The DEIS has not provided a sufficient reason to proceed with the Licking Creek Timber Sale at this time. One of the stated purposes and needs behind this project is to "seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest Timber."<sup>1</sup> The Forest Service has been unable to sell the timber offered for sale over the past few years, therefore the demand for additional timber from this project is unjustified.

CBD-1

**The DEIS fails to address the precipitous decline in demand for Tongass timber and the reduction of the local timber industry**

The prices being bid for Tongass timber today are so low that the Forest Service recently issued an emergency directive extending all Tongass timber sale contracts to give the purchasers more time to cut them. The volume of both cut and sold timber on the Tongass is at a 50-year low, reflecting an extremely low demand for Tongass wood products. In 1996 the Tongass NF sold 227 MMbf of timber. In 2000, just 66% of the

CBD-2



85.3 MMbf of timber offered was sold. In 2001, 67.9 MMBF were offered for sale, but only 49.6 MMbf sold. And most recently, in FY 2002, the Tongass sold just 24.4 of the 70.3 MMbf of timber offered for sale. Nearly 300 million board feet of Tongass timber remains under contract, and uncut due to depressed prices and weak markets.

In addition to the low prices and low demand, a significant portion of the demonstrated mill capacity in the Tongass that existed a few years ago has disappeared from the region. The KPC pulp mill closed in 1997. The KPC ward cove sawmill closed in 1997. The Annette Island sawmill closed in 1998. The Klukwan Forest Products mill closed in 1998. The Pacific Rim Cedar Mill in Wrangell closed in 1999, and the much touted Gateway veneer mill in Ketchikan is languishing in bankruptcy and legal proceedings. The mill closures since 1996 have reduced the regional mill capacity by over 50 percent.

Furthermore, the DEIS provides inadequate and misleading information about the current demand for timber in Southeast Alaska, because data about the low level of logging over the past year are not considered, and because data from previous years are inaccurately inflated by inclusion of volume cut under the close-out provisions of the Louisiana-Pacific long-term contract. The long-term timber contracts that previously dominated and strangled the SE Alaska timber markets no longer have any bearing on the demand for Tongass timber. Any reference to them in estimating current market demands should be eliminated from on-going NEPA analyses.

#### **The DEIS fails to adequately analyze effects on the local economy**

Two additional goals provided in the purpose and need section relate to employment opportunities and contributions to the local and regional economy. However, in discussing the impacts to the forest products industry the DEIS relies on numbers from 2000 and it fails to point out that the SE Alaska timber industry is no longer a substantial component of the economy in Southeast Alaska. In 1996 the timber industry in SE AK

CBD-3

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<sup>1</sup> Licking Creek Timber Sale DEIS 1-2

directly employed 1,911 people and represented 5.63% of jobs in the region. Today, according to AK Dept. of Labor statistics the woods products industry in SE employed just over 1 % of the region's workforce. Stating that one of the driving forces behind this project is to provide employment opportunities within southeast Alaska needs to be considered within this context.

The SE Alaska economy is increasingly more reliant on non-extractive, forest dependent industries that require a clean, healthy, and intact forest and marine environment.

Recreation and tourism are growing rapidly and they depend on healthy populations of fish and wildlife, beautiful scenery, and large undeveloped tracts of wildlands. Logging and road building damage the local environment and place healthy ecosystems at risk by: eliminating critical wildlife habitat; fragmenting important wildlife corridors; and reducing salmon and trout spawning and rearing habitat through siltation and increased stream flow. Clearcutting, road building and log dump operation has a significant negative impact on the beautiful scenery that so many visitors come to enjoy.

The Licking Creek Timber Sale may well have an overall negative impact on the local economy because of its effects on non-timber, forest dependent industries. However, because the DEIS does not analyze those impacts the public, the decision-makers do not have adequate information to make this determination.

The economic analysis for the Licking Creek DEIS also fails to take into account any socio-economic issues outside of timber development. This is particularly disturbing since one of the key issues identified in the DEIS is economic need. Yet, the document never discusses or analyzes the economic impacts of the project on commercial and sport fisheries, recreation, tourism, subsistence, aesthetics, etc. Such an analysis must include the direct and indirect economic contributions of the Licking Creek areas on these other sectors of SE Alaska's economy. As with other projects planned on the National Forests of Alaska and throughout Region 10, the Forest Service has failed to complete an

CBD-4

economic analysis of the Licking Creek Timber Sale that provides the public with a full and fair accounting of net economic benefits.

The Licking Creek DEIS fails to incorporate any useful information about externalized costs passed on to communities, businesses, and individuals in conjunction with this project. These include the direct, indirect, and cumulative economic costs associated with:

- 1) lost recreational opportunities and decreased tourism;
- 2) degraded commercial and recreational fisheries within the boundaries of the Tongass National Forest and downstream and offshore;
- 3) degraded habitat for important game and fish species and loss of hunting and fishing opportunities both within and outside of the Tongass National Forest;
- 4) increased flooding and disruption of the normal flows in rivers and streams;
- 5) loss of non-timber forest products such as wild mushrooms, herbs, and medicinal plants;
- 6) exacerbation of global warming through release of greenhouse gasses;
- 7) diminished quality of life of neighboring communities;
- 8) loss of biological resources that either have value now or have as yet unknown but potentially large economic and social value;
- 9) loss of biological and genetic resources that can improve the long-term productivity of all forest land;
- 10) diminished pollination services provided by species that pollinate important forest and agricultural crops; and  
lost jobs and income associated with timber production on private lands that is displaced by Tongass National Forest timber sales.

CBD-5

#### Wildlife Concerns

We are concerned about negative impacts the Licking Creek Timber Sale will have on wildlife and wildlife habitat. Due to the high levels of historical logging in the province,



the 1997 TLMP designates this area as a higher risk bio-geographic province. Fifty-two percent of this project area is in a developed state. The high level of human disturbance in the area is already a stress to wildlife; additional logging and road construction will only enhance threats to this at-risk ecosystem. The USFS preferred alternative 4, which will harvest the greatest amount of timber and build the most miles of new roads, would clearly have the greatest impacts on fish and wildlife habitat. As a general concern, we are disturbed to see throughout the DEIS rather than actually analyzing the impacts of this project to wildlife and wildlife habitat, the document merely regurgitates information regarding such species and the relevant TLMP standards and guidelines. This does not fulfill the hard-look requirement of NEPA.

CBD-6

**The Licking Creek Timber sale will fragment an already heavily fragmented ecosystem.**

The Tongass is naturally a fragmented ecosystem. This natural fragmentation has been drastically exacerbated by anthropogenic factors, primarily logging and road construction. Highly fragmented habitat may provide little or no benefit for many wildlife species.<sup>2</sup> Indeed, many terrestrial species are negatively affected by fragmentation of their natural habitat. Protection of biodiversity and wildlife viability is one of the critical reasons for protecting very large expanses of forest.

*"In naturally fragmented landscapes, such as the Tongass, there are heightened concerns regarding fragmentation, isolation of populations, and local population extinctions. Under these conditions, unroaded areas may play a critical role in maintaining ecosystem health...Because ecosystems in SE Alaska are naturally fragmented, the loss of roadless area conditions may pose a high risk to species existence and persistence...."*<sup>3</sup>

Habitat fragmentation is a critical issue for wildlife populations in the Tongass because of the natural fragmentation of the landscape and because the forest has been further fragmented by over 5,000 miles of roads. Because ecosystems in naturally fragmented landscapes are less resilient to further fragmentation, logging additional unroaded areas poses a higher risk to

<sup>2</sup> Joint statement of members of the peer review committee concerning the inadequacy of conservation measures for vertebrate species in the Tongass National Forest Land Management Plan. 9-24-1997



species existence and persistence. We are disturbed to see many of the units are adjacent to areas that have already been heavily fragmented due to past logging. The amount of fragmentation of old growth in the Licking Creek area has significantly increased since the 1950's. The USFS preferred alternative 4, will result in the greatest further increase. We request that a fragmentation analysis be done for the province, similar to the Southeast Chichagof Landscape Analysis completed by the Chatham Area, and that its findings be made available to the public prior to any continued planning on this project.

CBD-7

**The Licking Creek Project fails to protect wildlife corridors and connectivity.**

The TLMP recognizes the importance of protecting wildlife corridors and specifically requires a review of landscape connectivity. This includes specific direction to provide stands of productive old growth as corridors where existing corridors are insufficient.<sup>4</sup> The 1998 USFS Powell Directive<sup>5</sup> also requires an evaluation of landscape connectivity and beach fringe connectivity. It specifically requires the Forest Service to work with ADF&G and USFWS to consider maintaining additional habitat during project-level analyses and to provide for designation of additional corridors in some situations. Given the impact of past logging on the beach and riparian areas of the Licking Creek Project area, this is exactly the type of situation envisioned by TLMP and the Powell Directive. Rather than do this, the Licking creek DEIS fails to even discuss wildlife corridors and connectivity at all.

CBD-8

One of the weaknesses identified by the 1997 TLMP peer review team was the inadequacy of the plan in its protection of wildlife corridors. The scientists felt that beach buffers and other corridors were too narrow and did not adequately provide connectivity between reserves.

<sup>3</sup> USFS Roadless Area Conservation FEIS, 1950-3, Nov 2000; vol. 1, 3-372.

<sup>4</sup> TLMP Landscape Connectivity Standards, page 4-120

<sup>5</sup> Tongass National Forest Land and Resource Management Plan Implementation Policy Clarification, August 1998.

*The beach fringes only connects areas between coastal habitat blocks, not those in the interiors of islands or the mainland. A 1,000 foot beach fringe is too narrow, subject to blowdown, and in at least some places is degraded by past logging. To provide secure wildlife movement among reserve areas (and to facilitate regular genetic interchange), corridor standards should at least be on the order of ...a no-cut zone of 2,000 feet in width.<sup>6</sup>*

The Licking Creek Project clearly falls short of providing adequate wildlife corridors. As discussed above, the project area has already undergone extensive habitat modification from past logging activities. The result is that much of the project area does not have the mature beach fringe that the USFS tends to rely upon to serve as wildlife corridors. Additionally, logging has compromised miles of streams in the project area. This past logging was done under a very different set of standards and guidelines than the current 1997 TLMP. Furthermore, large portions of the beach fringe and many streams in the Project Area occur on private lands. Since these lands are not under the control of the USFS, there is no guarantee that any mature beach fringe that may exist on these lands today will not be logged in the future-eliminating use of these areas as wildlife corridors. It therefore would be inappropriate for the project to rely upon these areas to provide landscape connectivity critical to wildlife in the area. Please provide the public with a detailed analysis of wildlife corridors and connectivity in relation to this project.

### **The DEIS inappropriately relies upon the 97 TLMP to protect wildlife viability**

The DEIS finding that wildlife viability will be protected, tiers to the 1997 TLMP.

*It is believed that the old-growth conservation strategy, together with species-specific standards and guidelines, are sufficient to provide an amount and distribution of habitat adequate to maintain viable populations of vertebrate species, as well as the diversity of plant and animal communities (USDA Forest Service, 1997).*

The DEIS fails to recognize there has been significant scientific disagreement over the viable population strategy of the 1997 TLMP. In 1996, the Scientific Peer Review Committee on

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<sup>6</sup> Joint statement of members of the peer review committee concerning the inadequacy of conservation measures for vertebrate species in the Tongass National Forest Land Management Plan, 9-24-1997

Tongass Forest planning concluded that "logging and related activities on the Tongass National Forest pose a significant risk to the viability of populations of several wildlife species associated with old-growth."

In a 1997 statement from the Committee concerning the inadequacy of conservation measures for vertebrate species in the Tongass National Forest Land Management plan of record, the committee concluded, "We believe that the plan adopted in May 1997 will not ensure viable, well distributed populations of wildlife species adapted to Old-growth forest on the Tongass National Forest."

In regards to the reserve system, the Committee found the reserves of TLMP inadequate.

*"The Forest Service has accepted, in principle, the need for habitat reserves as part of its strategy for conservation of wildlife on the Tongass. The agency continues, however, to rely on an inadequate reserve system. TLMP documents defend this approach in large measure by pointing to the absolute number of acres that will not be directly logged. This analysis ignores the adverse consequences of fragmenting habitat. Highly fragmented habitat may provide little or no benefit for many wildlife species. ... In general, the reserves are not appropriately designed in size and location, and do not preserve the remaining large blocks of high quality habitat on the Tongass."*

Based upon the scientific panel's assessment of the 1997 TLMP it is clear the plan does not meet the requirement that the forest plan provide "for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species".<sup>7</sup>

To ensure the viability of all native vertebrate species, the TLMP Scientific Peer Review Committee specifically recommended:

- All remaining large blocks of Old-growth forest be protected. Any further fragmentation of existing large blocks of high volume Old growth should be prevented. At a minimum the three largest patches of Old growth should be protected in each ecological province.
- The Forest's remaining pristine watersheds should be protected.

CBD-9

<sup>7</sup> 36 CFR 219.27 (a)(6)



The Licking Creek Project fails to follow these recommendations and therefore fails to protect species viability. Furthermore, as detailed in the discussion below on marten, five years after the TLMP was designed many of the assumptions used to design the wildlife viability strategy are unsupported or have proven erroneous. It is inappropriate for the Licking Creek Project to tie to TLMP when it is clear that TLMP does not guarantee protection of species viability.

CBD-9,  
cont.

The Licking Creek project poses risks to marten viability.

Marten are well documented as preferring old growth forests below 1500 feet in elevation. The quality and quantity of such habitat is the limiting factor for winter survival for the marten. Because much of the Licking Creek Project area has already been heavily logged and roaded, and because marten are easily trapped and over-harvested, the Center is particularly concerned about impacts of this project on marten. Density of roads affects the quality of habitat for marten, and increases their vulnerability to over harvest. A habitat capability model used to evaluate marten habitat on the Tongass National Forest predicts declines in marten densities at road densities as low as 0.2 miles per square mile, and population declines of 90 percent where road densities approach 0.6 miles per square mile.<sup>8</sup> All alternatives for the Licking Creek Timber Sale far exceed this 0.2-mile threshold.

The post harvest road densities under the preferred alternative will exceed those recommended for marten. Rather than redesigning the plan to satisfy the needs of marten, the DEIS rationalizes that the road density is not a problem because the roads are not connected to any communities, and therefore the marten will not be impacted. This reasoning is absurd. Nowhere in the TLMP does it provide for an exception to the requirement to meet marten standards and guidelines because the roads are not connected to any communities. There is no evidence that additional roads in the area will not increase hunter access and therefore directly

CBD-10

<sup>8</sup> Suring, L. H., D. C. Crocker-Bedford, R. W. Flynn, C. S. Hale, G. C. Iverson, M. D. Kirchhoff, T. E. Schenck II, L. C. Shea, and K. Titus. 1993. A Proposed Strategy for Maintaining Well-distributed, Viable Populations of Wildlife Associated with Old-growth Forests in Southeast Alaska. Report of an Interagency Committee. Unpubl. review draft report. Juneau, AK.



impact marten. Given that this is a high-risk area for marten, the lack of analysis presented in the DEIS on this issue is inexcusable.

The DEIS provides no information regarding the population of marten in the Licking Creek Sale area and no surveys for marten have been completed. It seems rather bold to make the finding that this sale will not impact marten when the USFS is obviously working in an information vacuum. The focus of logging in higher value forests and the construction of a new road network in the Licking Creek Project Area will plainly have a significant impact on marten populations, to claim otherwise is clearly absurd. Furthermore, asserting that no marten will be impacted by the project begs the question since the USFS and ADF&G have no idea what the current population is, it is impossible to determine if increased mortality poses a risk to a population when the population is unknown.

CBD-11

Because the Licking Creek project is within a high-risk bio-geographic province, TLMP requires specific standards and guidelines for management of marten habitat. The DEIS states the applicable standards and guidelines, but does nothing to assure the public that they can and will be met. One such requirement is that the GIS volume strata and stand structure used to identify high value marten habitat be updated. It is unclear whether the structure requirements that will be employed in units containing high value marten habitat have been calculated based on the entire unit or only on the high value habitat portion of that unit. Please provide the public with the necessary information to address this issue. The Center is also concerned that the silvicultural method described for the preferred alternative fails to meet the requirements of TLMP for marten. There must be substantially more disclosure and analysis in the EIS concerning both direct and cumulative impacts to marten. Because of marten sensitivity, any logging that may occur in high value marten habitat should be single-tree selection only.

CBD-12

CBD-13

Lastly, the DEIS erroneously relies upon the TLMP to protect marten viability. However, five years after the TLMP was adopted it is clear that several assumptions made in

designing TLMP in terms of marten viability are either unsupported or just plain wrong. These including the following<sup>9</sup>:

- TLMP assumes that openings smaller than 2 acres will have no adverse effect on martens if openings occupy < 25% of a stand-this has not been tested.
- TLMP's assumption that leave trees in partially harvested units should be evenly distributed rather than clumped, while speculative insights suggest that clumping leave trees may be better for marten habitat
- No evidence exists in regard to the appropriate width of habitat corridors for dispersal
- No literature exists in regard to the rate of population exchange that must occur between reserves to maintain metapopulation function
- TLMP assumed that large reserves would support 25 adult female martens; however, a study on Chichagof Island indicated that a large reserve of minimal size (40,000 acres) will not support this number of martens during years of low prey abundance, and may not support 25 adult female martens during years of high prey abundance.
- Due to the heterogeneous nature of the forest in southeast Alaska, it has not been possible to differentiate demographic factors – productivity, survival and population density – between high volume and medium volume timber strata, nor between uplands and riparian areas.
- Male marten home ranges, as large as 4,718.46 acres w/ median size of 1,358.7 acres. (Flynn 1994) This is 2.7 to 13.59 times larger than the 100-500 acres listed as utilized by the TLMP Marten table (L5).
- It may be inaccurate to assume that 200-year-old stands provide sufficient habitat for marten (Alaback 1982a and 1982b, Schumacher 1999). Two hundred-year-old stands may lack the large woody structures and structural complexity near the ground that martens use for denning and resting, and they may lack undergrowth sufficient to support small mammal populations.

CBD-14

<sup>9</sup> Robertsen J.M, Schumacher T. and Crocker-Bedford C. The American Marten (*Martes americana*) as a Management Indicator Species for the Tongass NF Land Management Plan: TLMP Assumptions, Recent Information, and Priorities for Studies and Monitoring- working drafts: 8 December 2000 and 1 November 2000.

- Recent research on Chichagof Island indicates that assumptions of marten density within reserves may be unrealistically high (Flynn and Schumacher 1996). These numbers may need to be modified prior to determining if the conservation strategy will maintain viable populations.
- No scientifically defensible analysis exists to support the assumptions in TLMP regarding the minimum size of a viable population of martens.
- There have been no studies to determine if the Forest Plan Standards and Guidelines are, or can be implemented properly. The only marten monitoring related to TLMP that has been completed is a small monitoring project conducted on the Wrangell Ranger District to evaluate the implementation and effectiveness of the marten Standards and Guidelines for the Nemo Loop Timber Sale. Results indicated that an insufficient number of trees of the correct diameter were retained and a number of trees had been lost due to windthrow.

CBD-14,  
cont.

**The Licking Creek project does not protect marbled murrelet nests**

The TLMP requires a 600-foot circular buffer of undisturbed forest surrounding marbled murrelet nests. Because the Forest Plan provides specific direction to protect such areas, it is implicit that to do so one must first survey for nests. Without conducting site-specific project inventories, it is impossible to locate, and therefore protect habitat for the murrelet as TLMP intended. Murrelets have been documented in the project area, but no attempt at locating nests has been made. We request specific inventories be conducted to locate marbled murrelet nests in the project area.

CBD-15

**The Licking Creek project violates the requirement of TLMP that wolf habitat and dens be protected**

The Center is extremely concerned about impacts from logging and road construction on the Alexander Archipelago wolf. The health of wolf populations is closely linked with old-growth forests. In a study of the Alexander Archipelago wolf on Prince of Wales Island, all documented wolf dens found were in old-growth forests. Core-use areas of wolves studied on the island occurred in the least densely roaded portion of their home range. Mortality due to hunting and trapping (due to increased access) was higher in areas with higher road



densities.<sup>10</sup> As the amount of road access increases, it is more likely that human caused wolf mortality (from both legal and illegal hunting) will become more difficult to manage. Limiting new road construction is the most obvious choice. The interagency wolf conservation strategy developed in conjunction with the 1997 TLMP recommends a reserve system of 50,000 acres be present for every 192,000 acres of landscape where the wolf occurs. Please provide the public with the information necessary to show this requirement has been met for wolves in the Licking Creek area.

CBD-16

TLMP also requires a 1200' forested buffer around wolf dens. The DEIS indicates that no wolf surveys have been completed for the Licking Creek. It is implicit in the requirement of TLMP to protect wolf dens, that in order to do so, the dens must first be located. We request surveys be done to identify wolf dens with the Project Area. We also request that the carrying capacity analysis be redone to consider the effects of management activities on all land ownerships including state and private lands in the area. It does not appear from the DEIS that this was taken into consideration.

CBD-17

## The DEIS distorts the impacts of road density on wolves and marten

The range of area used to analyze impacts to wildlife fluctuates in the DEIS. For example, in discussing road densities in terms of wolf impacts the document looks at the road density of the entire WAA 406. For this WAA, road density during the project implementation is 0.4 miles per square mile and 0.3-post harvest. While it is appropriate to look at the WAA or biogeographic province in performing deer/wolf habitat capability models, this is not the appropriate scale to analyze road density. For marten, road density in the DEIS is analyzed in terms of the VCU 7460. The road density for this area, 0.9 to 1.0 mile per square mile during implementation and 0.8 miles post harvest. This clearly exceeds the 0.7 threshold established to protect wolves. Rather than admit this, the DEIS distorts the fact by analyzing the much larger WAA rather than the VCU or the Project Area. The most appropriate way to represent the road density is by WAA,

CBD-18

<sup>10</sup> Person, D. K., M. Kirchhoff, V. V. Ballenberghe, G. C. Iverson and E. Grossman. 1996. The Alexander Archipelago wolf: a conservation assessment. General Technical Report. PNW-GTR-384. USDA Forest Service. Pacific Northwest Research Station. Portland, Oregon. 42 p.



VCA and project area, rather than exclusively relying on the very large WAA. Furthermore, the DEIS fails to provide the necessary data to understand how many people use the current road system in the project area, and the VCU and anticipated future use of a larger road system. The DEIS also fails to discuss how the increase demand for fur may result in increased hunting pressure that will impact marten, wolf and other furbearers in the area

CBD-19

#### The Licking Creek Timber sale fails to protect Endemic Mammals

The Tongass is home to 54 species of mammals including 24 species or subspecies that are endemic to the stretch of the North Pacific coast encompassing southeast Alaska.<sup>11</sup> Twelve other taxa in southeast Alaska have ranges that extend only to coastal British Columbia.<sup>12</sup> Approximately 80-90% of all worldwide vertebrate extinction is believed to have occurred on islands. Endemic species of the Tongass often have small populations and are special risk as a result of human-caused disturbance.<sup>13</sup>

The DEIS does a miserable job at discussing endemic mammals in the area. No project level surveys were done for this project in clear violation of the TLMP standards and guidelines for small endemic mammals. The only species mentioned in the document are the flying squirrel and the ermine. Other endemics species, or those that are largely confined to southeast Alaska, documented on Revillagigedo Island include the dusky shrew, red squirrel, Keen's mouse, red backed vole and the long tailed vole.<sup>14</sup> Of particular importance is the Revillagigedo Island red-backed vole (*Clethrionomys gapperi solus*), a unique subspecies of the Southern red-backed vole. The only

CBD-20

<sup>11</sup> MacDonald SO, Cook JA (1996) The land mammal fauna of Southeast Alaska. *Canadian Field-Naturalist*, 110, 571-598.

<sup>12</sup> Nagorsen DW (1990) *The Mammals of British Columbia: a Taxonomic Catalogue*. Memoir no. 4. Royal British Columbia Museum, Victoria.

<sup>13</sup> Joint statement of members of the peer review committee concerning the inadequacy of conservation measures for vertebrate species in the Tongass National Forest Land Management Plan. 9-24-1997

<sup>14</sup> MacDonald SO, Cook JA. The Mammal Fauna of Southeast Alaska. University of Alaska. 1999.

documentation of this species is from two localities on Revillagigedo Island.<sup>15</sup> The abundance of this species is unknown. This species appears to be imminently threatened by habitat loss and fragmentation from logging and is vulnerable because of its highly restricted range. Increased predator populations could have detrimental effects on population viability for this species.

Before the DEIS can make the bold statement that small endemic mammals will be protected surveys for such mammals must be conducted as required by TLMP. Second, a comprehensive habitat association studies, particularly in pre- and post-logging areas, should be done to determine existing or potential threats from logging activities on the island. Lastly, a population viability model should be developed to estimate habitat size requirements and potential impacts of habitat fragmentation for known endemic small mammals.

CBD-21

## The Licking Creek project poses unwarranted risks to the band-tailed pigeon

We are concerned that the Licking Creek Sale poses a risk to what may be one of the few nesting colonies of band-tailed pigeons on the Tongass. The Tongass is the northern range of this species. The Pacific coastal population of this species is experiencing drastic declines due to logging and related activities. Since band-tailed pigeons were observed in the project area in 1998, 1999, 2000 and 2001 the area may present a unique opportunity to study re-occupancy of an area for this little understood species. The ADF&G has raised this issue on several occasions requesting surveys be done and research performed to assure the viability of this species on the Tongass is not put at risk from this and other timber related projects. In a recent letter regarding the band tailed pigeons and the Licking Creek project the ADF&G stated "We would like to reiterate our recommendation that the Forest Service collect more information on this rare species

CBD-22

<sup>15</sup> NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6 . Arlington, Virginia, USA: NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: December 20,

prior to attempting to design more timber sales within the area."<sup>16</sup> We also formally request that project level inventories be completed for the band-tailed pigeon and analysis be provided regarding impacts of this project on the band-tailed pigeon forest wide viability.

**The Licking Creek Project may pose risks to goshawks.**

The DEIS does a miserable job of outlining potential impacts of this project on the sensitive Queen Charlotte goshawk. The document states that most goshawk habitat is within protected beach/estuary areas. First, it is well documented that suitable goshawk habitat is defined as high volume class strata (with timber volume greater than 20 thousand board feet (mbf) per acre, slopes less than 60% and below 1000' elevation, contiguous forest habitat outside of beach fringe and riparian buffers. Second, the DEIS fails to discuss that at least 284 acres of beach fringe have been harvested in the past and now offer unsuitable goshawk habitat. Lastly, it does not appear that the FS did the requisite amount or level of surveys required to detect goshawk activity in the area. We request at least one additional season of goshawk surveys be done in accordance with the best scientific methods available.

CBD-23

**The Licking Creek Project Fails to protect heron and raptor nests as required**

The TLMP requires project level inventories be conducted to identify heron rookeries and raptor nesting habitat using the most recent inventory protocols and provides for a 600 foot nest buffer.<sup>17</sup> There is no discussion of such inventories being conducted for this timber sale.

CBD-24

2002). See also; MacDonald SO, Cook JA The Mammal Fauna of Southeast Alaska. University of Alaska. 1999. P 40.

<sup>16</sup> Letter from Jack Gustafson, Area Habitat Biologist ADF&G to Jeremiah Ingersoll, Ketchikan District Ranger, USFS. Sept. 25, 2001

<sup>17</sup> TLMP 4-116



For the FS to meet the clear standard of TLMP it must do surveys for all raptors including owls. Owls are obviously an intended beneficiary of the S&G as they specifically are mentioned. Effective owls surveys intent on finding nest sites must be done between March and late April with the optimal survey time between April 1-15. Owls that respond to vocalization calls in late spring or summer, when Goshawk surveys are performed, are non-breeders; hence it will not be possible to locate nests. For this reason such surveys can not be conducted incidental to goshawk surveys. In the case of Licking Creek it appear such surveys were not conducted at all.

### The DEIS fails to adequately address the 1997 TLMP Management Indicator Species

We are dismayed at the manipulation of monitoring requirements for the thirteen Management Indicator Species (MIS) selected under the 1997 Plan. In the 1997 TLMP, 13 MIS species were identified. Since that time the USFS has decided to eliminate 7 of these species from the MIS list. This change from TLMP was done with no public knowledge or opportunity for public review. The Forest Service formulated MIS task groups, again without public input. Reports from these tasks groups have never been made public, even in draft form, although the documents are referenced often by various Forest Service documents. For example, the 2000 Annual Monitoring and Evaluation Report for the Tongass clearly describes these reports as forthcoming. Yet it is now January of 2003, five years after the adoption of the Forest Plan and the task force reports are still not finalized or available.

CBD-25

The DEIS fails to adequately assess impacts to the MIS species identified in the 1997 TLMP. The document looks solely at three species; wolf, deer and marten. These species do not adequately represent impacts of the project on cavity nesters, or any of the MIS bird species. No discussion or rationale is provided for failing to discuss impacts to the brown creeper or red squirrel. The table lists the red-breasted nuthatch as an MIS species- this appears to be an error and should be the red-breasted sapsucker. Furthermore, this species is excluded from analysis because it is "abundant and adaptable

CBD-26



in the project area". This misses the entire point of why the MIS species were chosen to begin with!

**The DEIS fails to adequately assess the impacts of logging and road construction on Essential Fish Habitat**

The Magnuson-Stevens Fisheries Conservation and Management Act outlines a process for the National Marine Fisheries Service (NMFS) to comment on activities proposed by federal agencies that may adversely impact areas designated as essential fish habitat (EFH). Specifically, agencies are required to consult with NMFS on any action authorized, funded, or undertaken that may adversely impact EFH.<sup>18</sup> An EFH Assessment must contain (i) A description of the action, (ii) An analysis of the potential adverse effects of the action on EFH and the managed species, (iii) the Federal agency's conclusions regarding the effects of the action on EFH, (iv) proposed mitigation, if applicable<sup>19</sup>. EFH in Alaska includes all streams, lakes, ponds, wetlands and other water bodies currently and historically accessible to salmon in the state.<sup>20</sup>

The Act defines an adverse effect as "any impact which reduces quality and / or quantity of EFH. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions."<sup>21</sup>

The need to analyze such impacts is further supported by the agreement reached between the Alaska Regional Offices of the USFS and the NMFS regarding the EFH consultation process. That agreement states "The EFH assessment will include ...an analysis of

<sup>18</sup> 50 CFR § 600.920

<sup>19</sup> 50 CFR § 600.920 (3)(e)

<sup>20</sup> Environmental Assessment for Essential Fish Habitat Amendment 5 to the Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska. January 20, 1999

<sup>21</sup> 50 CFR § 600.910 (a)

individual and cumulative effects of the action on EFH, the managed species, and associated species such as major prey species, including affected life history stages.<sup>22</sup> The watersheds in the Licking Creek Project Area have been heavily impacted by past logging- much of which occurred before riparian buffers were required. The results of these actions include increased stream bank erosion, sedimentation, changes in flow regime including shallower channels and swifter water in places. Currently at least 12 of the 29 existing Class II stream crossings in the area may impede fish passage. The USFS preferred alternative would have the greatest impacts on fish and water resources.

The Essential Fish Habitat Analysis for the Licking Creek fails to meet the requirements of the consultation process identified above. Specifically, the DEIS falls short in providing information regarding an in depth analysis of direct and indirect impacts to EFH and fails to provide any cumulative impact analysis as required. In southeast Alaska, logging is considered the largest potential threat to anadromous fish habitat.<sup>23</sup> Logging and associated road construction has resulted in degraded habitat by causing increased erosion and sedimentation, changes in temperature regimes, and changes in seasonal flow patterns.<sup>24</sup> The Environmental Assessment on EFH for salmon fisheries in Alaska recognized that logging is well documented as resulting in adverse impacts to fish and fisheries habitat. Potential impacts from logging identified in the report include: an increase in bedload suspended sediments and turbidity from construction of logging roads, in-water stream crossings, exposed slope erosion, removal of streamside vegetation; alteration of streamflow; introduction of excessive nutrients, a decrease in large woody debris; increase in streambank erosion; alteration of temperature, and toxic effects on biota. The following is an excerpt from the EFH Environmental Assessment section on logging and EFH.

CBD-27

CBD-28

<sup>22</sup> EFH Consultation Agreement between the USDA Forest Service, Alaska Region and the National Marine Fisheries Service, Alaska Region. May 1, 200 (A)(2)

<sup>23</sup> *Essential Fish Habitat Assessment Report for the Salmon Fisheries in the EEZ*. Alaska Department of Fish & Game, National Marine Fisheries Service, North Pacific Fishery Management Council. March 31, 1998

<sup>24</sup> *Id.*

*Forest road construction can destabilize slopes and increase erosion and sedimentation. This erosion occurs in two forms, as mass soil movement (i.e., landslides) and as surface erosion. Both types can introduce debris and sediment into adjacent streams for many years after initial construction. Erosion is most severe where poor construction practices are allowed, inadequate attention is paid to proper road drainage, and where construction occurs in inclement weather. After construction, unpaved logging roads can be a chronic source of sediment to streams. Juvenile salmon avoid habitat areas with suspended sediment (Bisson and Bilby 1982). Stream crossings by forest roads may block fish migration. Culverts are often installed as an economical alternative to bridges, although bridges are usually less disruptive to the stream environment. Culverts are a serious threat to salmon unless specifically designed, installed, and maintained to accommodate fish passage.*

*Removal of streamside vegetation during timber harvest activities increases solar radiation to the stream and results in warmer water during summer, especially in small streams. The magnitude of temperature change depends on the amount of timber harvested adjacent to the stream (Meehan et al. 1969; Brown and Krygier, 1970) and time for regrowth of riparian areas. In Southeast Alaska, Meehan et al., (1969) found that maximum temperature in logged streams exceeded those of unlogged control streams by up to 5°C, but the temperature did not reach lethal levels. The increased water temperature, however, frequently exceeded the optimum for pink and chum salmon documented by Reiser and Bjorn (1979).*

*High summer air temperature has been associated with adult salmon mortality. The Alaska Department of Fish and Game compiled a list of 43 streams that had mortality of pink and chum salmon in 1977 associated with high water temperature and low flow. The largest clear-cut in Alaska is located in the Staney Creek watershed. In 1979, 15,000 pink salmon died there before spawning, a result of warm water and low oxygen. In northern areas, the removal of riparian vegetation may cause lower stream temperature during winter, increasing the formation of frazil and anchor ice.*

*By removing vegetation, timber harvest temporarily reduces transpiration losses from the watershed, thereby elevating water content of soil and increasing run-off during base-flow periods. The elevated water content can reduce soil strength and destabilize slopes, causing increased sediment and debris inputs to streams (Swanston 1974). Sediment deposition in streams can reduce benthic community production (Culp and Davies, 1983) and can cause mortality of incubating salmon eggs and alevins, and habitat loss for juvenile salmon (Heifetz et al. 1996). Cumulative sedimentation from logging activities can significantly reduce the egg-to-fry survival of coho and chum salmon (Cederholm et al. 1981; Cederholm and Reid 1987; Hartman et al. 1987). Where egg-to-fry survival is*



*impaired by habitat deterioration escapement goals may have to be increased to offset the effect of decreased spawning success.*

*Converting large portions of old-growth forests to rapidly growing second-growth forests can permanently reduce summer stream flows and thus permanently reduce salmonid production (Myren and Ellis, 1984). The studies of streams in second-growth forests have demonstrated that the input of large, potentially stable debris (logs and stumps) into salmon habitat from second-growth is reduced relative to inputs from old growth stands (Bisson et al. 1987). Further, the initial high productivity of prey organisms in streams running through open canopy (clear-cut) is short-lived and eventually the quantity of food organisms declines as the canopy closes (Sedell and Swanson, 1984).<sup>25</sup>*

The Licking Creek DEIS fails to discuss any of the well-documented impacts of logging practices discussed above. Instead it offers a surface discussion of impacts to class I streams, no in depth analysis of such issues is provided. The DEIS lacks any discussion at all regarding indirect impacts, such as prey species reduction or species fecundity, in the EFH section as required in the consultation process.

Furthermore, the DEIS completely ignores the requirements that cumulative impacts be considered as part of the consultation process. "Essential fish habitat can be significantly altered by direct, cumulative, and/or environmental impacts. A cumulative impact can be minor, but if not monitored will contribute to the significant alteration of EFH over time."<sup>26</sup> Cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

To date no cumulative impact analysis has been completed to determine impacts of logging to EFH across the Tongass National Forest. Cumulative impacts on EFH have also not been analyzed in the DEIS on the site-specific level for the Licking Creek

CBD-29

<sup>25</sup> Environmental Assessment for Essential Fish Habitat Amendment 5 to the Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska. January 20, 1999. §9.1.2

<sup>26</sup> Id at §9.1.1



Project Area. A brief discussion of cumulative impacts is found in the fisheries section of the DEIS. Instead of analyzing the cumulative impacts of this project, the DEIS tiers to the findings in the 97 TLMP fisheries section. Since the EFH consultation requirement, including the need to look at cumulative impacts, was put into effect after the 1997 TLMP was issued, tiering to the Forest Plan is inadequate to meet the requirements of the EFH analysis. Given the heavy amount of logging that has already occurred in the Licking Creek project area, a cumulative impacts analysis is needed for this project. Instead the DEIS recognizes that past logging in the project area has resulted in a loss of fisheries habitat, but writes it off as inconsequential.

The DEIS recognizes that the Licking Creek Sale “may adversely effect” EFH. We concur with this finding and request a cumulative impacts analysis be performed to determine adverse impacts from logging on EFH for both the Licking Creek Project as well as the Tongass National Forest as a whole before planning continues on this sale.

**The DEIS fails to accurately consider surrounding lands in determining cumulative impacts.**

As discussed above cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. Rather than take a hard look at cumulative impacts of logging and road construction in the project area, the DEIS relies on TLMP standards and guidelines, monitoring and mitigation. The DEIS fails to adequately consider impacts of past, present and future logging on all lands within the area surrounding the Licking Creek Timber Sale.

CBD-30

The area surrounding this sale includes Cape Fox Corporation lands as well as USFS land that has been either harvested in the past or expected to be in the future. The DEIS fails to

provide vegetation maps or other information to describe the current condition of the surrounding private lands. The DEIS states that almost 3,00 acres of timber have been harvested in the past within the project area. It does not discuss past logging in the areas surrounding the project area including those under private ownership. The DEIS only discuss two reasonably foreseeable future actions- the Sea Level EIS and the Mop Point/ 91 Knot Timber Sale. This fails to take into account potential future logging on private lands in the area and future FS in the area beyond the next 2 years.

By failing to evaluate in detail the "cumulative effects of a proposed action with other proposed actions" the DEIS does not satisfy the requirements of NEPA.<sup>27</sup>

We request that a hard look analysis of cumulative impacts (as defined above) be performed for this sale. This includes addressing impacts to wildlife (including population viability of deer, wolf and other sensitive species discussed above), karst, wetlands, economics, subsistence activities and recreational opportunities.

## **The Licking creek project is highgrading the largest and most valuable trees.**

The DEIS fails to provide adequate information relating to stand composition. The document states that yellow cedar is in decline in some of the project area, but never reveals exactly what percentage of the project area is composed of yellow cedar, what percentage of this is scheduled for harvest under each of the alternatives, and of this what percentage is in decline. Since yellow cedar is a small component of the overall Tongass forest base and since it is in decline in many places, we request that should the sale move forward that any removal of yellow cedar be minimized. Furthermore, the DEIS fails to acknowledge that cedar is usually exported in the round and therefore must be removed when computing economic benefits of this sale to communities.

CBD-31

CBD-32

We also believe that either unit locations have been gerrymandered, or the project area has been selected, in a way that targets high yield- high value, but relatively rare trees.

CBD-33

<sup>27</sup> . See Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d (9<sup>th</sup> Cir 1999)

This includes yellow and red cedar as well as the higher volume spruce and hemlock stands. The DEIS makes it clear that the high volume stands are being disproportionately targeted for removal. For example, table 3-33 demonstrates under the preferred alternative 4, 2 acres of low volume, 130 acres of medium volume and 562 acres of high volume forest will be harvested. It is also clear that past logging in the area has already removed the largest trees, leaving no volume class 7 trees and very few volume class 6 trees in the area.

**The Licking Creek project poses threats to unstable soils in the area.**

We are very concerned about the impacts logging on unstable slopes may have on water quality, riparian areas and associated fish and wildlife. We are dismayed that more than 85 acres defined as at high risk for soil erosion are slated for harvest under the preferred alternative. This includes 60.1 acres of slopes greater than 72%. To date more than 264 acres have been harvested from slopes 72% or greater in the project area. In discussions with members of our organizations who have visited the Licking Creek Project Area, we were alerted to a number of slides already present in the area and the belief that soils in the area are particularly unstable. We request should this sale move forward that no logging occur on any slopes greater than 72%.

CBD-34

**The Licking Creek Project puts unique and highly vulnerable karst resources at risk.**

We are very concerned about the resource damage that the Licking Creek Timber Sale poses to unique karst resources in the area. The Upper Carroll Inlet has extremely unique Ash and resurgence caves as well as geology unlike that anywhere else on the Tongass. While it appears that some attempt has been made to map the karst in the area, we believe that much of the carbonate rock fails to appear on the area's geological maps and therefore many pockets of karst remain unidentified. Carbonate blocks and related karst drainages have been located under units 10, 33, 34, 35, 40, 64, 65, 67 and 71 with a main carbonate band running under the later five of these units. Extensive karst and cave

CBD-35



systems have developed under units 34 and 35.<sup>28</sup> The unit cards do not guarantee the public that these unique resources will be protected and make large assumptions that field crews are able to identify and protect appropriate windfirm buffers.

As with other valuable resources, the preferred alternative 4 would pose the greatest risk to karst. This alternative would harvest 234.1 acres of karst, a 12.4% increase over past harvest on carbonate rock. Proposed roads on carbonate rock would represent 16% of the cumulative roads within the project area.<sup>29</sup> Past logging has already impacted 856 acres, or 45.21 % of karst land in the project area. Should this project go forward, 63.5% of the known karst in the project area would be cumulatively impacted.

CBD-36

While the TLMP karst standards and guidelines attempt to protect at some level the unique karst of the Tongass, they fall miserably short of doing so. Furthermore, the Standards and guidelines fail to adequately compensate for past poor logging practices. Areas defined as of moderate vulnerability that may have been harvested under current practices without serious damage to karst are now of higher vulnerability because of previous damage to the system. This seems especially true in areas of high sink and grike density that are not deep enough to be considered high vulnerability under current S&G's. Because of the past damage done to karst on the Tongass, and that these areas are invaluable global treasure, we request further in-depth analysis be done on the impacts to karst in these areas. We also ask that the Tongass Cave Project specifically be asked to review the sale and visit the project area.

CBD-37

### Conclusion

As detailed above, the DEIS for the Licking creek Project fails to fulfill the requirements of taking a "hard-look" analysis at the projects potential impacts as required by NEPA. Furthermore, the purpose and need to move forward with this sale has not been justified. For these reasons we support the selection of the no action alternative. Should the FS

<sup>28</sup> Licking Creek Geology, Minerals, and Karst Resource Report. Jim Baichtal 12-17-02



decide to move forward with this sale, we expect that the legal obligations outlined above be met and that a supplemental EIS be done to address the concerns raised above. Please keep us updated on this and any other projects on the Ketchikan Ranger District.

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<sup>29</sup> Id at 5.

## Appendix B

### Forest Service Response to Center for Biological Diversity/Sitka Conservation Society/Wilderness Society:

#### **CBD 1:**

The purpose and need for the Licking Creek project reflect the goals and objectives for Timber Production Land Use Designation, which encompasses the majority of the project area.

Appendix A of the Licking Creek Draft EIS explained how this and other timber sale projects fit into the multi-year timber program on the Tongass National Forest and how demand is calculated. This appendix has been updated for the Final EIS to reflect the current market demand for the Tongass. The Licking Creek Timber Sale project is a necessary component of meeting this demand, which is expected to average 168 MMBF per year for 1997-2010. The suitable and available land base on the Tongass is capable of supporting an Allowable Sale Quantity of 267 MMBF annually. Based on the projected market demand for the planning cycle, all suitable timberlands will eventually be scheduled for harvest to meet the current and projected demand for raw forest products in Southeast Alaska.

The *Tongass Ten Year Timber Sale Schedule* is updated annually (Forest Plan, page 4-95). Due to litigation and court injunctions concerning the Roadless Area Conservation Rule and the Forest Plan Supplemental EIS for wilderness designation, the schedule has undergone extensive revision recently.

#### **CBD 2:**

The additional contract time given to purchasers was to allow more time in which the market may improve or in which they can mix their high-priced sales with lower priced sales. Figure 3-1 in the Timber Economics section illustrates market fluctuations over past quarters (1998-2001).

Appendix A of the Licking Creek Final EIS has been updated to reflect the current market demand for the Tongass. (See also response to CBD Comment 1.) The Draft EIS reported that there has been a decline in regional timber industry employment from 1991 to 2000 (Table 3-1), and we have added a discussion of 2002 data to the Final EIS. We now also discuss non-timber resource-based employment in the Timber Economics section. This information shows that timber is still an important component of the Ketchikan Gateway Borough economic base (estimated to be 9.4 percent in 2001).

#### **CBD 3:**

This comment is a Forest Plan issue and is outside the scope of this project. Citing 2001 data, the Forest Plan Final Supplemental EIS for wilderness recommendations (2003) reported that wood products employment had dropped 72 percent between 1990 and 2000, accounting for 3 percent of total employment in Southeast Alaska in 2001. However, wood products employment still comprised a significant percentage of total employment in the more southern Southeast communities: 9 percent in Ketchikan Gateway Borough, 15 percent in Prince of Wales and outer Ketchikan area, and 6 percent in the Wrangell-Petersburg area (Table 3.4-30, Forest Plan SEIS, page 3-312).

#### **CBD 4:**

The Licking Creek project is a timber sale, and one of the issues raised was timber economics. We have expanded the discussion of the effects of the project on non-timber activities in the Final EIS, under Timber Economics, Projected Employment and Income. In that section, we state that the effects of the project would be minimal on non-timber activities, because very little activity occurs in the project area outside of timber harvest. This is supported in the discussion of effects on Watershed and Fish Habitat, Subsistence, Scenery, and Recreation in Chapter 3 of this Final EIS.

An analysis of the net benefit is appropriate at the Forest Plan level. Chapter 3 of the Forest Plan Final SEIS (2003) contains extensive analysis of the economic and social environment on the Tongass. The Licking Creek project is being prepared, in part, to implement the Forest Plan. It is designed to be fully consistent with the applicable management direction and standards and guidelines of the Forest Plan.

#### **CBD 5:**

The Forest Plan Final EIS includes a comprehensive analysis of the economic and social environment of Southeast Alaska, the Tongass National Forest, and the communities within these areas. This analysis was conducted by an interdisciplinary team that included economists, social scientists, recreation planners, wildlife and fish biologists, as well as other disciplines. The Licking Creek Project was designed to implement the Forest Plan, and tiers to the analysis in the Forest Plan Final EIS.

The Forest Service is not required to quantify the non-market benefits and costs associated with every timber sale. They are very difficult to accurately quantify in monetary terms. However, the Forest Service is required to insure that unqualified environmental amenities and values are given appropriate consideration in decision making along with economic and technical considerations. Large portions of the Licking Creek Draft and Final EIS have been devoted to analyzing the potential effects of the project on non-quantifiable environmental amenities and values, such as water resources, recreation and scenery, wildlife, subsistence, and social concerns.

#### **CBD 6:**

Wildlife species on the Tongass are usually analyzed by looking at their respective habitats, using models as an analysis tool. (This is discussed further in the Wildlife section, Chapter 3 of this Final EIS.) As an example, the Sitka black-tailed deer was analyzed for both the project level and the WAA level, using the most recent version of the deer model. Habitat is the most critical portion of the deer model: every area in the analysis is given a habitat score based on its value to deer in the winter. The model is used to predict the changes in habitat that have already occurred or that are expected to occur before the end of the rotation (100-year harvest rotation).

The Forest Plan Standards and Guidelines for wildlife were designed to maintain habitat capability and therefore sustain viable populations over the long term. The Standards and Guidelines are used in conjunction with research results to analyze project effects and design mitigation (Forest Plan, page 2-5).

#### **CBD 7:**

The biogeographic province is a scale that is beyond the scope of this project. The Forest Plan Final EIS analyzed larger geographic areas and left project-level analysis for more restricted areas immediately surrounding the proposed action. (The landscape connectivity analysis is presented in the Forest Plan Final EIS, Appendix N-10 to N-16.)

#### **CBD 8:**

Connectivity (fragmentation) analysis is recommended to be done at the landscape level (Forest Plan Standards and Guidelines, Wildlife XVIII.A.2, page 4-120). The Licking Creek project area lies entirely within the previous Sea Level Timber Sale project boundary. The small old-growth reserves and landscape connectivity were examined for the Sea Level Timber Sale EIS, and old growth reserves were adjusted to meet connectivity concerns. The Sea Level Timber Sale area consisted of several VCUs, which met the landscape scale requirement. For the Licking Creek project, an interagency team of biologists reviewed and approved the old growth reserves as delineated in the Sea Level Timber Sale EIS. The existing condition of habitat corridors in the project area were also considered. (This is discussed in the Biodiversity and Old Growth section of Chapter 3 of this Final EIS.)

The OGR strategy for the Forest is meant to be used as a coarse filter to maintaining viability across the entire Forest. As stated in TPIT, there is no specific requirement to ensure connectivity between all small reserves or between small reserves and non-development LUDs. The Licking Creek project area is adjacent to the Misty Fjords National Monument to the east and a semi-remote recreation area to the north.

#### **CBD 9:**

Viability is a Forest-wide issue. The Forest Plan was been found adequate in regard to viability (Forest Plan Final EIS, Appendix N). Under 40 CFR 1502.20, we may tier a project-level analysis to a broad program-level environmental impact statement, such as the Forest Plan Final EIS.

#### **CBD 10:**

The Wildlife section in the Final EIS references a paper by Suring et. al. (1992) for the road density figures given, not a Forest Plan Standard and Guideline. The Standards and Guidelines in the Forest Plan do not require a road density of 0.2 mi/mi<sup>2</sup> in marten areas. The Standard and Guideline states that if "...road access has been determined...to significantly contribute to unsustainable marten mortality, implement effect road closures...and develop and implement road management objectives..." Higher road densities can result in declines in marten populations by increasing the trapping pressure; when the road system is isolated from a community (as in the project area), the trapping pressure is less. The Final EIS also states that current marten harvest levels in the project area are low and harvest levels should not increase significantly as a result of this project.



## Appendix B

### **CBD 11:**

Population numbers of all species fluctuate due to a number of factors and are difficult to track. All species in the document are analyzed by examining their habitat, not the actual population. Forest Service Manual 2622.01(2) states that "Management of habitat provides for the maintenance of viable populations...generally well distributed..." The changes in habitat that can reasonably be attributed to the proposed project are revealed in the Issue 2: Wildlife section of the Draft and Final EIS. The Draft and Final EIS state that a 2 to 7 percent reduction in habitat capability at the VCU level is anticipated from this project. The prescriptions for all units with high-value marten habitat leave the required structure as called for in the Standards and Guidelines of the Forest Plan. Both the Silviculture and Wildlife sections of the unit cards (Appendix B of the Draft EIS) contain this information if the unit includes high-value marten habitat.

### **CBD 12:**

The structure requirements are calculated on the portion of the unit that contains high-value marten habitat. This is consistent with the direction given in TPIT (pg. 13). Each silvicultural prescription displays the acres of high-value marten habitat in the unit and the acres to be deferred.

### **CBD 13:**

All units that contain at least 2 acres of high-value marten habitat have had prescriptions developed that ensure that all standards and guidelines are met for marten. Even-aged clearcut with reserves is a prescription that can be applied in areas of high-value marten habitat to meet marten standards and guidelines. At least 10-20 percent of the stand structure is placed into reserve. Stand exam data is used to calculate whether there are enough large trees (4 per acre greater than 20" dbh) and snags (3 per acre greater than 20" dbh) in the reserve areas. If not, a larger amount of acreage is left in reserve in order to ensure that the marten standards and guidelines are being met. A more detailed description of each prescription can be found in the unit prescriptions that are located within the individual unit folders at the district. These are part of the planning record.

### **CBD 14:**

Assumptions made in designing the Forest Plan are not handled at the project level. A mid-point review of the Forest Plan is beginning and any changes that are seen as critical will be made during this review. The Forestry Sciences Lab has ongoing research across the Tongass covering a variety of topics. Any relevant findings will be evaluated for inclusion in the mid-year review or the next revision of the Forest Plan.

### **CBD 15:**

Following the *Tongass National Forest Land and Resource Management Plan Implementation Policy Clarification* (a.k.a. TPIT, 1998) guidelines, field personnel are trained in the identification of marbled murrelets and sightings are reported to a biologist for follow-up. Using this method, a marbled murrelet nest was reported in Unit 71, and surveys are being conducted. Should this unit be selected for harvest in the Record of Decision, the required 600-foot forested buffer would be applied. Disturbance would be prevented during the active nesting season (generally May 1 to August 15). Annual monitoring would be conducted for at least 2 years to determine nest activity. If the nest remains inactive for 2 consecutive years, protection measures may be removed.

### **CBD 16:**

Person (1996) suggested that a 50,000-acre reserve for every 192,000 acres of landscape was necessary to support relatively secure core wolf populations. This recommendation was not incorporated as a Standard and Guideline in TLMP. The Forest-wide system of Old-growth Reserves functions similarly and is meant to cover a range of species, including wolves.

### **CBD 17:**

Following TPIT (1998) guidelines, field personnel report wolf sightings and potential den sites to the biologist for follow-up. In addition, ADF&G maintains a list of known den locations and are contacted to inquire about any known sites within upcoming projects. If a den is located, it would receive a buffer as required in order to meet Standards and Guidelines.

Carrying capacity analysis does consider all ownerships. The model incorporates a zero habitat value for all ownerships other than National Forest System land and therefore assumes a worst-case scenario of effects.



**CBD 18:**

TPIT) states that the watershed or VCU scale is too fine for the wolf analysis because wolves tend to have large home ranges that cross these boundaries. The Wildlife Analysis Area was selected as the appropriate scale of analysis to detect road density effects on wolves. The Forest Plan recommend open road densities of 0.7 to 1.0 mile per square mile to reduce wolf mortality in areas where mortality is of concern (Forest Plan Standards and Guidelines, Wildlife, XI.1.c). Marten home ranges tend to be smaller and thus the VCU is the appropriate scale for analysis for that species. Deer were analyzed at multiple scales (project and WAA) because the effects of the project are best detected at the project scale, and need to be analyzed at the landscape scale (WAA) for effects on wolves.

**CBD 19:**

In the Wildlife section of this Final EIS (Chapter 3, Wildlife, Road Impacts on American Marten), we state that "None of the roads are connected to the Ketchikan road system and road use is limited to foot travel or four-wheeler. Therefore, even though road density is fairly high, road effects on trapping pressure in the VCU are expected to be minimal." In the Recreation section (Chapter 3, Recreation, Existing Activities and Use Patterns), we state that "The project area is approximately 20 air miles from Ketchikan, the nearest community, and there is no road connection to Ketchikan. Access is by personal or commercial boat and aircraft. Consequently, the project area receives relatively little use for recreation activities..." For these reasons, new road construction is not expected to increase hunting or trapping levels in the area. Also, hunting and trapping levels are administered by the Alaska Department of Fish and Game, and would not be directly influenced by the Licking Creek project.

**CBD 20:**

Forest Plan Standards and Guidelines require surveys for endemic mammals on islands less than 50,000 acres in size (Forest Plan, page 4-120); Revillagigedo Island is considerably larger. At this time, identified subspecies are considered conspecific and minimal variation exists between the mainland and island populations (MacDonald and Cook, 1999), although ongoing research is investigating these variations. Timber harvest is not expected to increase the predator population in the area, and consequently is not expected to have a significant effect on the small mammal populations in the area. The proposed actions could decrease the raptor and wolf populations in the project area, but these are expected to remain viable (see discussion in Issue 2: Wildlife in Chapter 3 of this Final EIS).

**CBD 21:**

The best available data is used in project analyses. A comprehensive study of habitat and development of models would be done by the research branch of the Forest Service or another research organization. It would need to be peer reviewed and incorporated into the Forest Plan.

**CBD 22:**

Although band-tailed pigeons have been seen during the breeding/nesting season, no nests have been located. Additional surveys are being conducted in Spring 2003. We propose to monitor the area for 3 years post-harvest to determine whether or not the birds return to the area and continue to exhibit behavior consistent with breeding.

**CBD 23:**

The project will follow the Forest Plan strategy for maintaining viable wildlife populations. Part of this strategy includes the protection of beach and estuary and riparian areas. The protection of this low-elevation habitat across the Forest, along with Old-growth Reserves, is a key contribution to maintaining goshawk nesting and foraging habitat. Page 3-52 of the Draft EIS (and Final EIS) discusses the 284 acres of past harvest that occurred in the beach fringe, and that this habitat is no longer considered suitable to goshawk nesting.

The survey effort for goshawks is discussed in the Threatened, Endangered and Sensitive Species section of Chapter 3 of the Draft and Final EIS, and meets Forest Plan requirements for goshawk surveys. See also the Biological Assessment/Biological Evaluation for the Licking Creek project in Appendix D of this Final EIS.

**CBD 24:**

Following TPIT (1998) guidelines, field personnel are trained in the identification of herons and raptors, and sightings are reported to a biologist for follow-up. To date, no nests have been located within the project area for great blue herons or

## Appendix B

raptors. If nests of these birds are identified, a buffer would be provided around the nest location in order to meet Standards and Guidelines.

### **CBD 25:**

The Draft and Final EIS did not make a change to the Forest Plan. The Forest Plan lists 13 terrestrial MIS and 4 fish MIS, and any changes to MIS would be handled through Forest Plan revision. The species listed in the Forest Plan are monitored on a Forest-wide basis, but not necessarily for every project. We listed all 13 MIS, and the rationale for their selection or non-selection in the Wildlife section of Chapter 3 of the Draft EIS (and Final EIS). Forest Service Manual 2620.45 states that "each district ranger has the authority...to approve evaluation of management indicators in project plans and accompanying environmental analyses." Forest Service Manual 2621.1 allows for selection of management indicators that best represent the issues and concerns, and also directs consideration of species in demand for recreational, commercial, or subsistence use as possible MIS species. It further directs documentation of the rationale for this selection; this is provided in the Issue 2: Wildlife section of Chapter 3 of the Draft and Final EIS. Deer, wolf, and marten were selected for the Licking Creek project as the best representation for the issues of concern in that area.

### **CBD 26:**

The name of the red-breasted sapsucker has been corrected in the Final EIS, and the brown creeper and red squirrel have been included in the Final EIS. Forest birds, including bird Management Indicator Species (MIS), may be surveyed via point counts in areas where these birds are a major issue of concern, but these surveys are not required for all projects under the Forest Plan. Forest birds were not raised as an issue during public scoping, and consequently no surveys were planned or conducted specifically for the Licking Creek project. The basis for non-selection of some MIS, and for not conducting surveys in the project area for these species, is displayed under Management Indicator Species, in the Issue 2: Wildlife section of Chapter 3 of the Draft and Final EIS.

Snags provide important habitat for cavity nesting species. A snag density analysis during the Sea Level project found an adequate number of snags in all VCUs, including VCU 7460 where the Licking Creek project is located. Cavity-nesting habitat Standards and Guidelines, Old-growth Reserves, and trees left for Marten Standards and Guidelines contribute snags, and trees for future recruitment of snags, that may be used by these species. This information is in the Licking Creek project planning record and is available upon request.

### **CBD 27:**

The Essential Fish Habitat Assessment is tiered to the entire analysis presented in the Watersheds and Fish Habitat section of Chapter 3. Direct and indirect effects of the project are discussed under Environmental Consequences, while the cumulative effects of the project, considered with other scheduled timber sales, is discussed under Cumulative Effects. The EFH Assessment at the end of the section summarizes the effects discussion. It addresses the four points required under the Act. The project area contains very little Essential Fish Habitat, as defined by the National Marine Fisheries Service. Prey species reduction and fecundity fall into the realm of population management, which is under the jurisdiction of the Alaska Department of Fish and Game. The Forest Service manages fisheries habitats, and we assessed the potential effects of the project on fish habitat conditions.

The National Marine Fisheries Service's concurrence letter is included in Appendix B. They agreed that the project may adversely affect EFH, and that the appropriate measures to minimize those effects are the use of the Forest Plan Standards and Guidelines (including 100 foot buffers on all anadromous and high value resident streams), and Best Management Practices. The NMFS have no additional EFH conservation recommendations beyond these measures.

### **CBD 28:**

Although we did not reference the *Essential Fish Habitat Assessment Report for the Salmon Fisheries in the EEZ* (Alaska Dept. of Fish and Game, 1998), we did discuss the effects described. The potential effects of logging roads on mass soil movement (landslides) and surface erosion is presented in the Soils section of Chapter 3. Culverts and fish passage are discussed in the Watersheds and Fish Habitat section, as is the past harvest of riparian/streamside vegetation and its potential effects on stream temperature. The risk of increased stream bank erosion and sedimentation is reduced by the predominant channel types present in the project area, which is discussed in the Watershed and Fish Habitat section of Chapter 3. The anadromous fish stream reaches in the project area watersheds consist of hard-bottomed channels that function to transport sediment and large material. These channel types do not depend on large woody debris for proper function; consequently, the timber sale would not reduce the complexity of fish habitat in the project area watersheds.

The project area contains very little Essential Fish Habitat, as defined by the National Marine Fisheries Service. Prey species reduction and fecundity fall into the realm of population management, which is under the jurisdiction of the Alaska Department of Fish and Game. The Forest Service manages fisheries habitats, and we assessed the potential effects of the project on fish habitat conditions.

**CBD 29:**

Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) requires Federal agencies to consult with the National Marine Fisheries Service on activities that may adversely affect Essential Fish Habitat. This consultation is done at the site-specific project level because it is not possible to predict where Forest Plan implementation projects will take place (Forest Plan Final Supplemental EIS, page 3-27). This was done for the Licking Creek project. The cumulative effects of the project on anadromous fish habitat (EFH), considered with other scheduled timber sales, is discussed under Cumulative Effects in the Watershed and Fish Habitat section of Chapter 3.

**CBD 30:**

We have provided more detailed descriptions of the cumulative effects of actions on non-NFS lands in all sections of Chapter 3 of this Final EIS. Impacts on adjacent non-National Forest System (NFS) lands are included when these lands lie within the appropriate area of analysis, i.e. the project area, Value Comparison Unit (VCU), or Wildlife Analysis Area (WAA). The area of analysis varies by resource. The majority of resources are analyzed within the project area only. The larger areas, VCU and WAA, are used to analyze effects for Wildlife, Subsistence, and road density (Transportation). (Refer to the introduction to Chapter 3 under the subheading Land Divisions, page 3-3 in the FEIS, for a list of these areas.)

Approximately 103 acres of non-NFS lands lie within the project area, a patented mining claim that was previously harvested. Non-NFS lands outside of the project area are isolated and comprise a small percentage of the WAA. (See the Project Area Vicinity Map, Figure 1-1, for a display of non-NFS lands.) For these lands, we used site-specific resource information when available. When site-specific information was not available, we analyzed for a "worst-case-scenario" of effects. For example, non-NFS lands were assigned a "zero" (no value) for deer habitat. The methods used are explained in each resource section.

**CBD 31:**

We have added a discussion of the effects of the project, by alternative, on yellow and red cedar harvest, to the Silviculture and Timber Management section of Chapter 3 of this Final EIS.

**CBD 32:**

Only direct jobs were considered in the Timber Economics analysis in the Draft and Final EIS, and secondary benefits to supplier/service communities were not considered in the cost-benefit calculation. The job year/harvest ratios for logging and sawmill jobs that we used (NEAT analysis) assumed export of Alaska yellow cedar and domestic processing of other species (see Table 3-2 in the Draft and Final EIS). Export permits are based on the availability of local markets, on a case-by-case basis at the request of the purchaser, and export requires approval by the Regional Forester. Should this sale be granted an export permit for western red cedar, the corresponding fraction of the sawmill-related employment would not be realized in Southeast Alaska.

**CBD 33:**

The project unit boundaries were delineated, in part, to avoid inventoried roadless area, riparian areas, high vulnerability karst, and other resource concerns. This is discussed in Development of Alternatives in Chapter 2.

The percentage of timber harvest of the available suitable acres within each volume strata is displayed in the Silviculture and Timber Management in Chapter 3 of this Final EIS. By definition, commercial forested land must contain at least 8,000 board feet of net timber volume per acre. In addition, forested land is considered suitable and available for harvest only if it is physically suitable (meeting such factors as slope criteria) and also meets Forest Plan Standards and Guidelines. The total suitable and available forested land in the project area was determined to be 3,899 acres.

Within the suitable and available forested lands in the project area, all of the action alternatives would harvest amounts of high, medium and low volume strata in similar proportions to their occurrence. Approximately 85% of the project area acres are in high volume strata (Table 3-32, Chapter 3 of this Final EIS). In Alternative 2, 74 percent of harvested acres would be in the high-volume strata; in Alternatives 3 and 5, 79 percent; in Alternative 4, 71 percent; and in Alternative 6, 85 percent.



## Appendix B

Alternative 6 selects a higher proportion of high volume strata by limiting timber harvest to within 500 feet of existing roads, where the majority of higher-yield, high value trees are located.

### **CBD 34:**

The information on slopes greater than 72 percent presented in Table 3-40 of the Draft EIS, as well as the unit card maps, was generated from our GIS database, and did not include site-specific information. Estimates presented in the Soils section of Chapter 3 of the Final EIS represent more accurate estimates of harvest on slopes greater than 72 percent, since they rely on field observations. The acreage of proposed harvest on slopes greater than 72% as reported in the Final EIS is lower than that reported in the Draft EIS, because we have reserved many of these acres from harvest. We have used the best information available to determine the location of potentially unstable slopes as well as slopes greater than 72 percent, and we have visited these areas. Where we found soil stability concerns, the areas were either deferred from harvest or yarding recommendations were made to reduce soil disturbance and protect potentially unstable soils.

### **CBD 35:**

The geologic map used in the analysis of the Licking Creek project area varies greatly from the published U.S. Geological Survey data. The geologic data used is a direct result of 1) data gathered by the Forest Geologist during the Sea Level and Licking Creek project planning efforts; 2) a focused effort to update the geology of the area, via a contract with Harza Engineering Company, Inc. working with the Forest Geologist during the fall of 2002; and 3) from information provided by members of the Glacier Grotto working with the Forest Service under a Challenge Cost Share Agreement. Additionally, the results of field inventories conducted by other resource specialists, including soil scientists, foresters, and wildlife and fisheries biologists, are reflected in the final geologic database. It is possible that some small carbonate outcrops remain unidentified in the project area; however, the information provided for analysis in the Draft and Final EIS is the most complete data available. Furthermore, in recent efforts to update the geology of southeastern Alaska by the USGS, Forest Service data was incorporated.

It is assumed that because of the highly fractured nature of the carbonates, the climatic conditions of Southeast Alaska, and the peatlands proximal to the carbonate bedrock, karst has developed, to one extent or another, within all carbonate blocks. Therefore, the presence of carbonate is equated to karst topography. The "main" carbonate band consists of dolomitized marble. The undulating topography characteristic of a karst landscape is present but visible epikarst fractures and collapse features are not prevalent. The natural dissolution of dolomite is generally slower than that of limestone. It is suspected that the dolomitization of this marble band has in some way suppressed karst development. The smaller marble band in the Planning Area has developed very extensive karst and cave systems. Armed with an understanding of the level of karst development in these different units and the much-updated geologic information, every attempt was made to protect the karst and cave systems and mitigate the effects of any adjacent management activities. No management is planned in the vicinity of the known ash caves.

### **CBD 36:**

Figure 3-8 in this Final EIS shows areas of high vulnerability karst in the project area. Under Forest Plan Standards and Guidelines, no harvest would occur on high vulnerability karst lands under any alternative. Specific drainages that flow into identified karst features would also be protected. Traditional buffers of 100 feet beyond the slope break surrounding a feature were modified to include an unspecified distance to provide a "reasonable assurance of windfirmness" (RAW) buffer. A distance of two tree heights was applied as a minimum RAW buffer.

### **CBD 37:**

The Karst Review Panel convened in the summer of 2002, reviewed the current and proposed karst management strategies and inventory methods. They confirmed the appropriateness of the Tongass National Forest's karst management strategy and the proposed changes and clarifications. The management strategies the Panel reviewed were those implemented in the Licking Creek project area. The majority of past harvest has occurred on the dolomitized marble band where karst development is most subdued. Harvest unit design made every effort to mitigate the effects of the proposed action on the areas of sensitive karst, karst groundwater systems, and the caves found there. This included, protection of all insurgent streams and the watersheds that feed them. Areas of high sink and grike densities were considered high-vulnerability karst. (A "grike" is a solution-widened joint, the uppermost surface of the epikarst. The level of grike development is a good indicator of the level of karst development and how open the system is at depth.)





# Southeast Alaska Conservation Council

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January 21, 2003

Jerry Ingersoll, District Ranger  
Attn: Licking Creek  
3031 Tongass Ave.  
Ketchikan, AK 99901

Re: Comments on Licking Creek Timber Sale DEIS

SENT VIA FAX & MAIL

Dear Mr. Ingersoll:

The following comments are submitted on behalf of the Southeast Alaska Conservation Council (SEACC) and on the Licking Creek Timber Sale Draft Environmental Impact Statement (DEIS). This project proposes to log as much as 16.8 MMBF of timber from 790 acres of National Forest lands. Up to 5.5 miles of new road would be constructed and 4.1 miles of existing road would be repaired. The Forest Service proposes using an existing log dump at Shoal Cove.

SEACC is a coalition of eighteen volunteer conservation groups in fourteen communities across Southeast Alaska, from Yakutat to Ketchikan, including the Tongass Conservation Society in Ketchikan. SEACC's individual members include Alaska Natives, subsistence users, commercial and sport fishermen, hunters and guides, tourism and recreation business owners, small timber operators and high value-added wood product manufacturers, as well as sale area residents and businesses. SEACC is dedicated to safeguarding the integrity of Southeast Alaska's unsurpassed natural environment while providing for balanced, sustainable use of our region's resources.

## ALTERNATIVES

We support offering new timber sales off of the existing road system, thereby leaving the remaining segments of pristine old growth forest in the Tongass untrammelled. We commend the Forest Service for seeking out project areas where existing roads and infrastructure can be utilized. We can not, however, support any of the action alternatives proposed in this DEIS. Although one action alternative, Alternative 5, doesn't involve any new roads, it relies extensively on helicopter logging. It also focuses almost entirely on clearcut logging practices. This alternative is unreasonable because its economic viability is highly questionable due to the high logging costs associated with helicopter logging and current low market conditions. See DEIS at 3-10. We recommend the Forest Service consider a modified alternative 5 that removes all the

SEACC-1

ALASKA SOCIETY OF AMERICAN FOREST DWELLERS, Phil Baker • ALASKANS FOR JUNEAU • CHICAGO CONSERVATION COUNCIL, Denise  
TROTTER • THOMPSON GATHERING CLUB OF KAKE • FRIENDS OF BEKNEYS BAY, Jerome • FRIENDS OF GLACIER BAY, Guy Smith • JUNEAU ALUMNI SOCIETY,  
John H. Johnson • JUNEAU COMMUNITY CENTER, Edna M. Johnson • JUNEAU ENVIRONMENTAL GROUP, John A. Johnson • JUNEAU FISH & WILDLIFE CLUB,  
NARROWS CONSERVATION

proposed helicopter logging and increases substantially the amount of uneven aged cutting in the remainder of these units.

SEACC-2

#### THE LICKING CREEK PROJECT IS UNWARRANTED

As part of the stated purpose, the Licking Creek project seeks to "provide a timber supply sufficient to meet the annual market demand for Tongass National Forest Timber" (1-2). While we can support efforts to sell timber off the existing road system, we question the need for new road building proposed in this project to access additional volume. Given the reduction in volume cut over the past 3 years, the huge amount of uncut timber already sold and under contract, and the recent 3 year extension for many sales currently under contract, we question the need for more volume from this project area to meet market demand.

SEACC-3

The DEIS implies that maintaining a strong timber program is imperative to the survival of the communities without acknowledging that the economy base of the communities in Southeast Alaska is changing. In June of 2002, the Alaska Department of Labor listed 650 direct jobs regionally in lumber and wood products. Alaska DOL (2002). This includes jobs from Native corporation lands and, to a far lesser extent, State, University of Alaska and Mental Health Trust lands. Please explain how the conclusion in the DEIS is supported by this data.

#### THE LICKING CREEK PROJECT SHOULD HAVE BEEN CONSIDERED WITH THE SEA LEVEL SALE.

Value Comparison Unit (VCU) 746 was included in the Sea Level FEIS, completed in 1999, but that FEIS failed to adequately evaluate the cumulative effects of that sale and reasonably future timber sales in the same project area. For example, the Licking Creek timber sale, which the DEIS explains is on the *10 Year Timber Sale Schedule*, was never adequately considered in the Sea Level FEIS. NEPA requires the Forest Service to evaluate all impacts from the past, present and reasonably foreseeable future. See 40 C.F.R. 1508.7. This DEIS appears to be repeating this error again. Although the DEIS reveals (DEIS at p.3-98) that at least 2,850 acres of available and suitable acres will remain in this project area after this project is completed, the Forest Service fails to evaluate the effects from cutting this volume in the future in the DEIS. If all these acres are scheduled for cutting in TLMP, then this logging is reasonably foreseeable and the DEIS should evaluate the effects to resources in this specific project area from cutting all these acres now.

SEACC-4

#### THE DEIS FAILS TO ADEQUATELY DISCLOSE CUMULATIVE IMPACTS

Since the 1954, 2,954 acres of this project area has been aggressively logged (DEIS 3-97). The Carroll Inlet has been subject to continuous logging nearly every 5 years from 1954 through 1996 (DEIS 3-29).

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The piecemeal approach used by the Forest Service in this project area begs the question when will the next timber sale be in this area? In another 3 years?

SEACC-5

The DEIS claims that all new roads will be closed 3 years after timber harvest activities are complete (DEIS 3-20). Since the Forest Service has maintained virtually continuous timber harvest for the past 30 years, will these temporary roads be subject to another 30 years of use?

SEACC-6

#### CUTTING ON SLOPES OVER 72%

The Forest Plan recognizes the importance of protecting the integrity of soil and water in the region. In the Standards and Guidelines for Soil and Water, TLMP states the Forest Service will "plan and conduct land use activities to avoid irreversible or serious and adverse effects on soil and water resources." TLMP, S&W112.I.A.

According to TLMP, in order to achieve this standard the Forest Service must "evaluate soil stability, potential soil mass wasting effects, and stability of class IV channel systems. At the forest plan level, slope gradients of 72% or more are removed from the tentatively suitable timber base due to high risk of soil mass movement and accelerated erosion of class IV channel systems." TLMP, S&W112.I.A.5. This TLMP standard goes on to provide that cutting may be approved at the project planning level on slopes greater than 72% "on a case by case basis, based upon the results of an on-site analysis of slope and class IV channel stability and an assessment of potential impacts of accelerated erosion on downslope and downstream fish habitat, other beneficial uses of water, and other resources." The Tongass Plan Implementation Team's (TPIT) August 1998 clarification of this TLMP standard and guideline unambiguously lists the factors that must be analyzed in deciding whether to allow such harvest. These factors include: steepness, dissection, parent material, drainage, and potential impacts on downstream beneficial users.

Unit 12 contains many acres of slopes greater than 72% while units 2, 8, 9, 10, 19, 22, 29, 31, 34, 35, 39, 40, 44, 64, 65, and 71 all contain slopes greater than 72% at or near their border.

The DEIS states that soil-scientist have identified slopes that are greater than 72% yet have a landslide potential lower than MMI 4. However, the DEIS fails to furnish any of this analysis for public review.

SEACC-7

All or nearly all of units 1, 22, and 24 are located in MMI 4 soils and should be removed from the timber base altogether.

SEACC-8

#### WATERSHED ANALYSIS NEEDED

The DEIS details the degraded condition of streams within the project area. Licking Creek, Easy Creek, Marble Creek and Unnamed 19 watersheds have all been recently clearcut at: 28%, 31%, 28%, and 43%, respectively. Logging in 1989 in the Calamity



Creek watershed "removed the riparian buffer on Class II habitat in the center of the watershed" (DEIS 3-31).

The DEIS claims (at p. 3-34) that all the findings of the Anadromous Habitat Fish Assessment of 1995 (AFHA) was incorporated into TLMP. This statement is false. In fact, in response to problems identified with the existing project-level planning processes, the AFHA team called for "[m]ore comprehensive watershed analyses comparable to those in the PACFISH strategy, if just applied on priority watersheds where timber will be [cut], will provide for both [logging] and anadromous fish habitat protection." AFHA Report Synthesis at 14. TLMP, however, only requires watershed analyses "before making site-specific adjustments to Process group standards and guidelines." RIP2.1.B.

SEACC-9

TLMP also recognizes that "[a] more intensive, complex, and field-based watershed analysis will be needed in watersheds with ... more than 20% of the watershed acres" cut in the past 30 years. TLMP, Appendix J at J-2. Yet the DEIS provides no explanation for why this analysis wasn't done here. The fact that offerings approved in the Sea Level sale remain uncut at this time, the Forest Service has a chance to correct its failure in that earlier NEPA process now. Given the extensive cumulative impact of past road building and logging within 4 watersheds in this VCU, such an analysis is essential for a meaningful cumulative impact analysis.

SEACC-10

The DEIS claims that "a method to establish quantitative thresholds for cumulative effects has not yet been developed for watershed on the Tongass National Forest" (DEIS 3-39). However, TLMP specifically directs planners to use the basic framework for watershed analysis contained in the "Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis" (August 1995).

SEACC-11

#### THE LICKING CREEK PROJECT FAILS TO SURVEY FOR AND PROTECT KEY WILDLIFE HABITAT

TLMP requires forested, circular buffer zones to protect the nests and dens of various species. The nest of Marbled Murrelets, Herons, and Raptors warrant a 600-foot buffer. There is no evidence in the DEIS that a survey for any of these birds as been done despite recent sightings of the Marbled Murrelet

SEACC-12

Wolf dens also require a buffer zone of 1200 feet according to TLMP. Again, the DEIS contains no evidence that a survey was completed. Without surveying for nests and dens there is no way to ensure that appropriate buffer is provided.

SEACC-13

The sightings of band-tailed pigeons between the months of June and July from 1998 through 2001 by an interdisciplinary team of ADF&G, USFS, and USWWS biologists suggests that the rare bird uses this area for a nesting ground (Conversation with Jack Gustafson). The band-tailed pigeon is only found in the Rocky Mountains and in this region of Southeast Alaska/British Columbia. Scientists have had little opportunity to study this species. To ensure that a viable population is maintained for future study, the

SEACC-14



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Forest Service should avoid harvesting the units in which the species has been sighted, specifically units 10, 11, and 19

#### HIGHGRADING AND FOREST DIVERSITY

SEACC has long been concerned about the Forest Service's practice of targeting the highest volume stands that are the heart of the rainforest. See *Ghost Trees: Measuring the Vanished Forests of Southeast Alaska*, Letter from Kirsch, SEACC to Puchlerz, Tongass Forest Supervisor (Feb. 22, 2001)(SEACC's response to Forest Service's Critique of *Ghost Trees*). This practice of high-grading, or mining, the most valuable old-growth is short-sighted and destructive. The southern portion of the Tongass likely had the biggest trees in Southeast Alaska, but the vast majority of the biggest trees have already been cut. Though past logging in much of Revilla Island has targeted a disproportionate amount of the high-value stands, this DEIS fails to inform the public about the proportion of high-value stands contained in the proposed cutting units. The DEIS also fails to disclose the location of the remaining high-value stands in the project area in relation to the proposed cutting units

SEACC-15

The DEIS relies on a yield class model (high, medium, low), which, according to peer reviewed literature, does not relate to forest structure and does not provide sufficient data to analyze effects to forest resources. (See *Deconstructing the Timber Volume Paradigm in Management of the Tongass National Forest*, Caouette, et. al. USDA, PNW-GTR-482, March 2000). Although the Forest Service possesses structural mapping data, it has again refused to use the best info available to evaluate impacts to the most rare and specialized of Tongass habitats. This violates NEPA. See 40 CFR 5000.1(b); 1502.24.

SEACC-16

The DEIS (at 3-92) attempts to duck this issue by claiming that "[w]e are currently verifying the accuracy of Caouette's model for use in identifying those stands." Yet in a letter from the Forest Service to former ADF&G Commissioner Frank Rue, dated September 19, 2002, the Forest Service agreed to provide this information in future timber sale planning efforts. The table provided in the DEIS (Table 3-33 at p. 3-92) is insufficient to specifically identify the location of these higher valued habitat stands. We request the agency to provide us with field verified maps of the location of these stands in the FEIS.

NFMA and the planning regulations require the Forest Service to preserve diversity. See 16 U.S.C. § 1604(g)(3)(B); 36 C.F.R. § 219.27(g). The DEIS reliance on the yield class model prevents the Forest Service from adequately evaluating the impacts of project alternatives on the habitat conservation strategy, because an essential habitat attribute, stand structure, is missing. Without this essential data, the Forest Service can not adequately determine the effects of project alternatives on wildlife within the forest matrix between reserves, or whether TLMP's landscape connectivity objective is being met.

## LOG DUMPS

The DEIS does not disclose the existing levels of bark accumulation at the Shoal Cove log dump and the past, present and reasonably foreseeable environmental impacts to the marine environment and existing uses resulting from this degradation. While the DEIS states that a dive survey was done, the information from this survey should have been included in the DEIS for the purpose of fully informing the public about the environmental effects associated with this project. Without this underlying hard data, the Forest Service's generalized conclusions regarding potential effects to the marine environment and Essential Fish Habitat are unsupported speculation. This information must be included in the FEIS. In addition, promised adherence to log dump guidelines in the 1997 TLMP is meaningless because the Shoal Cove dump is a pre-1985 facility and the agency did not rely on any siting guidelines at that time relevant to protecting marine resources.

SEACC-17

SEACC-18

According to the DEIS (p. 3-67), barges can be used at this dump "at times of high tide." We strongly recommend the Forest Service to require an operator to use this method. If not, then the Forest Service needs to evaluate the costs and impacts associated with remediation at this site.

SEACC-19

## KARST

According to the unit cards, karst underlies portions of units 10, 33, 34, 35, 40, 64,65, 67, and 71. The Tongass Cave Project has recommended the karstlands in this area receive protection under wilderness status. Because of extensive previous logging on karst in this area, the Forest Service should consider removing units on karstlands from the Licking Creek timber sale plan. Given that the questionable effectiveness of existing agency surveys, vulnerability ratings, and karst mitigation, the final EIS should explicitly describe how the proposed mitigation measures chosen for the nine units on karst will fully protect the underlying karstlands and their associated hydrological systems.

SEACC-20

Significant karstlands underlay areas right outside unit 19, and the unit cards for units 9 and 14 indicate that these units were not fully surveyed prior to publication of the DEIS. These three units should be fully surveyed for karst features and vulnerability, and the Forest Service should adjust or remove the unit if needed to comply with TLMP karst standards and guidelines. These and the nine units listed above should have been additionally surveyed with dye-trace test to determine the extent of their hydrological systems.

SEACC-21

## YELLOW CEDAR REGENERATION

TLMP also requires the Forest Service to "[c]onsider regenerating and maintaining minor species, where appropriate for the site, as viable components of future stands and for vegetative diversity." TLMP, TIM111-2.LH. The DEIS acknowledges that "the proposed harvest units that do have cedar decline may have the Alaska yellow cedar salvaged from the stands. There may be some problems in adequately restocking those

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stands with Alaska yellow cedar; however, the decline has little or no direct influence on regeneration of other species" (DEIS 3-59). Given the expected decline of yellow cedar, the DEIS should also include data and detailed analysis regarding cedar decline.

SEACC-22

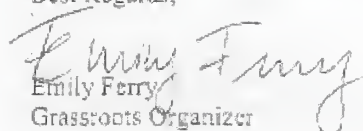
#### ECONOMIC EVALUATION IGNORES LOSS OF JOBS FROM CEDAR EXPORT

A bias in the analysis of employment and income associated with this proposed sale is the failure to account for the loss of local jobs resulting from the export of round logs. In this sale, a higher logging level most likely means the export of an increased amount of yellow and red cedar. This will result in exporting more jobs, while the region bears the cost of impaired resources and lost non-timber economic opportunities. Without requiring primary processing for cedar, the Forest Service cannot justify using the 3.33 sawmill jobs/numbf factor used for the 1997 TLMP, and cannot justify including any secondary benefits to supplier/service communities in its cost-benefit calculation. Removing the manufacturing jobs for a portion of the sale reduces the validity of the DEIS' timber supply and economics analysis. Using a more realistic job multiplier, the cost to existing uses cannot be justified under any of the action alternatives. In addition, since the DEIS never clearly discloses what percentage of the logging will be exported, the economic analysis clearly does not adequately display the economic and social effects of the proposed sale as it is currently configured.

SEACC-23

Thank you for the opportunity to comment on this timber sale project. We look forward to the Forest Service correcting the deficiencies noted herein in the final EIS.

Best Regards,

  
Emily Ferry  
Grassroots Organizer



## Appendix B

### Forest Service Response to Southeast Alaska Conservation Council:

#### SEACC 1:

Not all alternatives are economical given the current market conditions. Logging systems used in the various alternatives are intended to mitigate different resource concerns, which are addressed in the range of alternatives. This alternative was developed to respond to comments received during scoping. Alternative 5 is a good example of the cost of mitigation with respect to impacts of road construction. It is clear that one to two things happen: a) the volume that is accessible from the existing road system becomes less than if new roads are built, or b) timber sale economics becomes poor due to the high costs of helicopter yarding in lieu of new road construction.

#### SEACC 2:

New Alternative 6 in the Final EIS was designed to address these concerns, with the exception of unevenaged management. This alternative has no helicopter yarding and no new road construction. In SE Alaska, partial harvest is almost exclusively done with helicopter-yarding methods; therefore, the silvicultural systems were maintained as primarily even-aged, and units and portions of units requiring either road construction or helicopter yarding to access were dropped.

#### SEACC 3:

Appendix A of the Licking Creek Draft EIS explains how the project fits into the multi-year timber program on the Tongass National Forest and how demand is calculated. The Licking Creek EIS offers a range of alternatives with a mix of harvest levels and amount of road construction from no new road construction in Alternative 6 to 5.49 miles in Alternative 4. This range gives the decision maker room to make a decision.

The Draft EIS reported that there has been a decline in regional timber industry employment from 1991 to 2000 (Table 3-1), and we have added a discussion of 2002 data to the Final EIS. We also discuss non-timber resource-based employment in the Timber Economics section. This information shows that timber is still an important component of the Ketchikan Gateway Borough economic base (estimated to be 9.4 percent in 2001).

#### SEACC 4:

The regulations implementing NEPA at 40 CFR 1508.7 define "cumulative impact" as the impact on the environment which results from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Courts have held, generally, that when funding, planning, scheduling, or scoping of a project has begun, it is reasonably foreseeable.

At the time of preparation of the Sea Level EIS, the Licking Creek timber sale was not on the *Tongass Ten Year Timber Sale Schedule*. The Licking Creek sale was added after the Sea Level ROD, primarily to replace the volume in areas that became unavailable due to litigation. See Table A-5, Appendix A of this Final EIS for an explanation of the timber sale planning process and the most current *Tongass Ten Year Timber Sale Schedule*.

We analyzed the effects of the Sea Level timber sales (Madder and Buckdance) within the Licking Creek project area, and within the surrounding VCU and WAA, in the resource sections in Chapter 3 of the Draft and Final EIS, under Cumulative Effects. These sales are scheduled to be sold by 2004.

#### SEACC 5:

See response to SEACC Comment 4. At this time, no additional timber sales are proposed in the Licking Creek project area, or within the surrounding VCU or WAA. The most current *Tongass Ten Year Timber Sale Schedule* is displayed on the Tongass National Forest internet website ([www.fs.fed.us/r10/tongass/](http://www.fs.fed.us/r10/tongass/)), or can be obtained upon request. The ten year sale schedule is updated annually (Forest Plan, page 4-95). Due to litigation and court injunctions concerning the Roadless Area Conservation Rule and the Forest Plan Supplemental EIS for wilderness designation, the schedule has undergone extensive revision recently.

#### SEACC 6:

National Forest System roads are designed to varying standards depending on use. Temporary roads are usually short segments build to lower standards, on gentle terrain with few resource concerns. Classified roads are built to higher standards, either for higher traffic volume (arterial roads for hauling timber) or where temporary road standards are judged inadequate to ensure resource protection. Table 3-22, in the Transportation section of Chapter 3, summarizes the proposed



management of existing classified roads. Temporary roads are planned for use in a single timber sale, and are not to be used again. Infrequently, a temporary road is used as a beginning point for a classified road in a second timber sale; in this instance, the road is re-built to classified road standards. This is an unplanned event, but may be used to conserve resources.

#### SEACC 7:

Detailed on-site soil stability investigation reports are included in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, which is in the project planning record and is available upon request. Site-specific management recommendations can be found in the Unit Cards in Appendix B of the Draft EIS.

#### SEACC 8:

The information on MMI 4 soils presented in Table 3-40 of the Draft EIS, as well as the unit card maps, was generated from our GIS data. This data is used, along with other tools such as aerial photos, to determine the need for site visits to evaluate soil stability, but does not necessarily represent the conditions as they are on the ground. For example, Unit 1 was not found to contain MMI 4 soils during an on-site visit, since the soils were better drained than indicated on the map. An on-site visit by a soil scientist to Unit 22 found MMI 4 soils in the western half of the unit, and this area was reserved from harvest. Similarly, the southeast corner of Unit 24 was found to include MMI 4 soils during an on-site visit, and this area was reserved from harvest. Detailed on-site soil stability investigation reports are included in the Licking Creek Soils, Wetlands, and Floodplains Resource Report, which is in the project planning record and is available upon request.

#### SEACC 9:

We have clarified this sentence in the Final EIS.

#### SEACC 10:

We evaluated whether to conduct watershed analyses within the project area and determined that they were not needed for several reasons. There is no significant fish habitat relative to production capabilities of other areas within the cataloging unit or watershed association. The composition of channel types consist of mostly high gradient, hard bottomed, transport channels. The resiliency of the stream channels, mostly high-gradient contained or hard bottomed, and low quality in terms of fish production, act to negate the previous harvest level. In other words, there are no significant habitat or populations downstream of sediment sources (transport stream systems).

Although no watershed analysis was completed, the team did consider risks to water quality and fish habitat. A Sediment Risk Assessment was completed for the Sea Level Timber Sale Draft EIS, which encompassed the Licking Creek project area; the results of the assessment are summarized in the Watershed and Fish Habitat section. Areas of high concern were removed from consideration in any alternative. (These are discussed in Chapter 3, Watersheds and Fish Habitat, under Summary of Watershed Conditions.) With the removal of units of concern, harvest of the units proposed in any of the alternatives poses little to no risk to downstream fish habitat. Field reconnaissance and surveys, of every unit considered in each alternative, verified the lack of transport potential to fish habitat. All transport streams with downstream potential effects were buffered in accordance with Forest Plan Riparian Standards and Guidelines, or otherwise excluded from harvest, to prevent effects to downstream fish habitat and maintain channel integrity and function.

#### SEACC 11:

The Forest Plan directs the use of the *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis* (1995) as a framework if we identify the need to conduct a watershed analysis (Forest Plan Appendix J). We determined that watershed analyses were not needed within the Licking Creek project area. However, site-specific information was used to identify areas of high concern and these areas were removed from consideration in any alternative. (These areas are discussed in Chapter 3, Watersheds and Fish Habitat, under Summary of Watershed Conditions.) See also the response to SEACC Comment 10.

#### SEACC 12:

Field personnel are trained in the identification of marbled murrelets, herons and raptors, and sightings are reported to a biologist for follow-up. Using this method, a marbled murrelet nest was reported in Unit 71, and surveys are being conducted. Should this unit be selected for harvest in the Record of Decision, the required 600-foot forested buffer would be applied. Disturbance would be prevented during the active nesting season (generally May 1 to August 15). Annual monitoring would be conducted for at least 2 years to determine nest activity. If the nest remains inactive for 2 consecutive years, protection measures may be removed. To date, no nests have been located within the project area for great blue

## Appendix B

herons or raptors. If nests of these birds are identified, a buffer would be provided around the nest location in order to meet Standards and Guidelines.

### SEACC 13:

Field personnel report wolf sightings and potential den sites to the biologist for follow-up. In addition, ADF&G maintains a list of known den locations and are contacted to inquire about any known sites within upcoming projects. If a den is located, it would receive a buffer as required in order to meet Standards and Guidelines.

### SEACC 14:

Although band-tailed pigeons have been seen during the breeding/nesting season, no nests have been located. Additional surveys are being conducted in Spring 2003. We propose to monitor the area for 3 years post-harvest to determine whether or not the birds return to the area and continue to exhibit behavior consistent with breeding.

### SEACC 15:

Volume classes 6 and 7 provide the best available estimate of high-value old growth (coarse-canopy stands; Caouette, et. al., 2000). Tables 3-25 and 3-35 in the Final EIS display the number of acres of volume classes 6 and 7 proposed for harvest by alternative. A map that displays the location of volume classes 6 and 7 in the project area is in the project planning record and is available upon request.

### SEACC 16:

The rationale to classify productive old growth forest by high, medium, and low volume strata is discussed in the Forest Plan Final EIS (Chapter 3, Biodiversity, pages 3-18 to 3-19); however, we are not relying solely on this information. In addition, we are analyzing data for volume classes 6 and 7 as a better indicator of stand structure. See further discussion in the Biodiversity and Old Growth section, page 3-55 of this Final EIS.

### SEACC 17:

The current permit and Dive Survey report for the Shoal Cove LTF are included in the Final EIS as Appendix F.

### SEACC 18:

The Shoal Cove LTF has been continually upgraded, over the years, to meet stormwater guidelines and all Alaska Timber Transfer Facility guidelines since it was constructed prior to 1985. The site is permitted for an A-frame type facility that places logs in the water. There is also a permitted log storage (rafting) area adjacent to the transfer facility. The facility has been used as a site for barging logs at the operators choice. Continued use of the site for watering logs will not appreciably affect the amount of bark coverage on the marine environment as the volume of timber to utilize the facility, for this project and future project is within the permitted range.

### SEACC 19:

Currently, the Shoal Cove LTF is designed and permitted for use as either a barge or rafting facility. The timber sale contract does not have language that restricts LTF usage other than for timing. The State of Alaska tidelands permit and Corps of Engineers permit for the Shoal Cove LTF governs the method of log transfer to the saltwater. The Forest Service will continue to offer operators the option of either rafting or barging logs, as long as the permit allows both entry systems and the LTF can be operated within permitted guidelines.

### SEACC 20:

Harvest unit design was used to mitigate the effects of the proposed actions on the areas of sensitive karst, karst groundwater systems, and the caves found there. This included protection of all insurgent streams and the watersheds that feed them. Areas of high sink and grike densities were considered high vulnerability karst. (A "grike" is a solution-widened joint, the uppermost surface of the epikarst. The level of grike development is a good indicator of the level of karst development and how open the system is at depth.) Taking into account the level of karst development within each distinct geologic unit, by excluding the above mentioned areas from consideration of harvest, the effects to the karst lands and their associated hydrological systems should be minimal.

**SEACC 21:**

Given the glacial history and depth of sediment deposition associated with much of the project area, surveys were conducted in those areas having the highest probability for extensive karst development. Unit 19 is underlain by metasedimentary rock (phyllite), which is not conducive to karst development. (See Figures 3-7 and 3-8 in the Geology, Minerals and Karst section of Chapter 3 of this Final EIS.) Soil scientists and other resource specialists visited Units 9 and 14 during the unit design phase of the project, and no karst resources were identified. Survey results are in the project planning record. If during layout additional features were found, the appropriate Standards and Guidelines would be applied.

It was determined that dye-trace tests were not necessary within the harvest units proposed on dolomite, since observed streams were either on the surface or only went subsurface for short distances (a few feet) before resurfacing. Streams that flowed subsurface within other carbonate bands were fully protected and the karst systems they flowed into removed as high-vulnerability karst.

**SEACC 22:**

We have added a more detailed discussion of the effects of the project, by alternative, on yellow and red cedar harvest to this Final EIS, in the Silviculture and Timber Management section of Chapter 3.

**SEACC 23:**

Only direct jobs were considered in the Timber Economics analysis in the Draft and Final EIS, and secondary benefits to supplier/service communities were not considered in the cost-benefit calculation. The job year/harvest ratios for logging and sawmill jobs that we used (NEAT analysis) assumed export of Alaska yellow cedar and domestic processing of other species (see Table 3-2 in the Draft and Final EIS). Export permits are based on the availability of local markets, on a case-by-case basis at the request of the purchaser, and export requires approval by the Regional Forester. Should this sale be granted an export permit for western red cedar, the corresponding fraction of the sawmill-related employment would not be realized in Southeast Alaska.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, Washington 98101

January 21, 2003

**RECEIVED**

JAN 31 2003

Ketchikan-Misty Fjords  
Ranger District

Reply To  
Attn Of: ECO-088

Ref: 01-051-AFS

Jerry Ingersoll  
Attn: Licking Creek  
Ketchikan-Misty Fjords Ranger District  
Tongass National Forest  
3031 Tongass Ave  
Ketchikan, AK 99901

Dear Mr. Ingersoll:

The U. S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed **Licking Creek Timber Sale** pursuant to Section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act (NEPA) as amended. Section 309, independent of NEPA, directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions as well as the adequacy of information in the NEPA document.

The DEIS proposes to harvest between 5.4 to 16.8 MBF of timber and construct between 1.5 to 5.5 miles of new road on the 14,424 acre project area. Harvested timber would be transported to an existing Log Transfer Facility at Shoal Cove. Approximately 79% of the lands within the project area has a land use designation (LUD) for Timber Production. There are four Action Alternatives for the proposed project and the No Action Alternative. Alternative 4 is the Preferred Alternative. Alternative 4 proposes the largest harvesting of merchantable timber (790 acres) and the construction of the most total new road miles (5.5 miles).

EPA's main concerns with this DEIS are related to indirect and cumulative impacts of proposed silvicultural practices and road construction to water quality and fish resources, the Action Alternatives' reliance on even-aged silvicultural practices, and lack of project level watershed analysis. Also, we recommend that the FEIS examine another possible Action Alternative that would address and mitigate for cumulative impacts while maintaining moderate economic efficiencies so that the EIS could include a viable Alternative that is less damaging and yet still provides economic benefits.

EPA-1

EPA-2

At this stage of the NEPA process, however, EPA supports the objectives of Alternative 2 as the least environmentally damaging Alternative because it:

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- was designed to address concerns of cumulative effects of timber harvest on fish and water resources (DEIS, 3-38);
- was designed to avoid timber harvest in areas that have a potential to degrade stream habitat or are near riparian areas that already have been heavily harvested (DEIS, 3-31);
- was designed with a low level of timber harvest that would be dispersed across the watersheds; and
- was designed with the least amount of impact to karst resources in a project area that has already experienced harvesting activities on 45% of its karst lands (DEIS, 3-56).

Based on our review, we have rated the DEIS, EC-2 (Environmental Concerns - Insufficient Information). This rating and a summary of our comments will be published in the *Federal Register*. A summary of the rating system we used in our evaluation of this DEIS is enclosed for your reference.

Enclosed please find our detailed comments, which elaborate further on these issues. I encourage you to contact Tom Connor of my staff at (206) 553-4423 to discuss our comments and how they might best be addressed. Thank you for the opportunity to review this Draft EIS.

Sincerely,



Judith Leckrone Lee, Manager  
Geographic Unit

Enclosures

### EPA'S DETAILED COMMENTS FOR THE PROPOSED LICKING CREEK TIMBER SALES DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

#### Indirect and Cumulative Impacts

The FEIS should explain how proposed Action Alternatives will adequately address direct, indirect, and cumulative impacts in a project area that is currently experiencing negative impacts to its aquatic and fish resources. We believe that additional discussion of indirect and cumulative impacts should be included in the FEIS to satisfy the implementing regulations for NEPA (40 CFR 1502.16) and to aid in providing appropriate mitigation information to decision-makers.

EPA-3

The DEIS is clear that direct environmental impacts, due to past logging and road building, have negatively affected the integrity of Licking Creek, Easy Creek, Marble Creek, and Unnamed 19 watersheds in the project area, especially impacting water quality, stream and fish habitats. For example in Licking Creek watershed, approximately 28% of the Class II Riparian Management Areas (RMA) were harvested about ten years ago. During recent surveys in this watershed, "channel depth was shallower and flows swifter in the harvested area." In addition, after construction of Road 8446200 and subsequent timber harvesting, "landslides occurred that crossed the road and entered the floodplain" (DEIS, 3-31). Similarly, following harvesting activities in the Class II RMA of Unnamed 19 watershed, recent surveys showed that the stream channel was experiencing widening and material deposition (DEIS, 3-32). In 1972, 32% of the Class II RMA in Easy Creek watershed was harvested. During recent field surveys, the "channel appeared significantly wider and the composition of the streambed material changed to large cobble and boulder [material]." Also, Road 8400441 had washed out above the intersection with Road 8400440. Though outside the project area, Road 8400441 is located within Easy Creek watershed and this erosive wash out event "may have affected downstream fish habitat" (DEIS, 3-32). Finally, in Marble Creek, sedimentation of the stream channel was observed below Road 8400000 (DEIS, 3-32). As these examples illustrate, numerous environmental impacts from previous activities exemplified by road failures and geomorphological modifications (e.g., stream channel aggradation or streambed sedimentation) are actively occurring within the project area and should be reviewed in concert with any addition proposal for activities in the project area. Yet, the indirect and cumulative impacts are not adequately discussed in the DEIS and should be discussed in the FEIS.

EPA-4

In addition, since more logging and road construction is proposed within project area watersheds that have already experienced degradation, the FEIS should show how timber production activities will comply with Tongass National Forest Land and Resource Management Plan (TLMP) objectives that "use forest health management to protect resource values" and not exacerbate current watershed conditions.

EPA-5

### Alternatives

We suggest that the FEIS include another Alternative, based on a timber financial efficiency analysis, where environmental impacts could be less than Alternative 4 yet whose economic efficiencies are greater than Alternative 3. In reviewing the DEIS, we are concerned that only the Preferred Action Alternatives presents an Advertised Rate (per hundred cubic feet of timber) which is economically efficient, while all other Action Alternatives were assessed as economically inefficient and thus are below cost. We are also concerned that other Action Alternatives may exist that have less environmental impacts and yet may have acceptable economic benefits. Therefore, we recommend that the FEIS should also examine a possible Alternative designed with fewer proposed new roads, less timber harvesting, more selective cutting, and less helicopter logging that is also financially efficient.

EPA-6

Also, to address these and other land management concerns, we request a clearer discussion of the assumptions regarding the financial structure of sustainable timber economics for the benefit of the local economy, the forests, and aquatic resources.

EPA-7

### Proposed Even-aged Silvicultural Prescription as the Primary Practice

We are concerned that the main silvicultural prescription proposed under all Action Alternatives is even-aged timber management. The proposed primary prescription, would convert old-growth stands to even-aged stands. Table 3-35 on page 3-93 shows that clearing cutting is proposed for 96% to 100% for all lands that will be harvested in the Alternatives, while uneven-aged prescriptions are only nominally proposed.

The DEIS has not adequately explained why even-aged timber management is the primary choice over uneven-age management nor how proposed silvicultural management methods for all Action Alternatives would reduce reliance on clearcutting practices. We strongly recommend that the FEIS explain why clearcutting was closer to best meeting management objectives for these lands based upon an appropriate project level analysis.

EPA-8

As stated on page 8 of the Record of Decision (ROD) for the TLMP, forest-wide standards and guidelines include a directive to "ensure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process" and that uneven-age management systems will be utilized in areas where "equipment [suitable] to selective logging can be used." Also, the Modified 1997 Forest Plan states that its direction for these lands is to "seek to reduce clear-cutting when other methods will meet land management objectives." Since the DEIS did not disclose the feasibility either of implementing thinning, selective logging options or of proposing higher acreages of uneven-aged management, the FEIS should provide a discussion of the suitability of doing selective logging within the project area over a larger area.

EPA-9

Also, the FEIS should show the extent to which proposed silvicultural methods in the project area are consistent with the intent and direction of this section of the TLMP. While

EPA-10



clearcutting might be the most economically efficient harvesting technique (DEIS, 3-52), maintaining forest and watershed health will also provide beneficial returns while maximizing long-term sustainability of resources.

### **Lack of Watershed Analysis and Compliance with State Water Quality Standards**

While we understand that a watershed analysis is not required if a timber sale proposes to fully implement the Forest Plan Standards and Guidelines (DEIS, 3-34), the EIS does document that broad environmental impacts are actively degrading aquatic and fish habitat. As we stated in our scoping comments, we believe that watershed analysis is an important proactive tool for evaluating individual forest-wide components and their interrelationships and processes within the ecological system defined by a watershed. Again, we strongly encourage the Forest Service to include watershed analysis as an integral component of planning for this proposed timber sale as a method to get an accurate picture of current conditions.

EPA-11

The EIS documents impacts to beneficial uses from stream habitat modifications to increased incidences of sediment transport. The FEIS should clearly demonstrate how project implementation would still allow streams to comply with state Water Quality Standards, including an antidegradation analysis, as specified in the Antidegradation Policy (40 CFR 131.12). The EIS should provide a quantitative basis to judge whether physical and chemical parameters, such as temperature, turbidity, and sediment accumulation, will be kept at levels that will protect and fully support designated uses and meet Water Quality Standards under each of the action alternatives. In addition, the State's identification of water bodies with impaired uses (found in the State of Alaska 303(d) report), as well as the magnitude and sources of such impairment, should also be included.

EPA-12



**Forest Service Response to U.S. Environmental Protection Agency:****EPA 1:**

See response to EPA Comment 3 on indirect and cumulative impacts to water quality and fish resources.

See responses to EPA Comments 7 and 9 on use of even-aged silvicultural practices.

See response to EPA Comment 10 on lack of project level watershed analysis.

**EPA 2:**

See response to EPA Comment 5 on recommended new alternative.

**EPA 3:**

In order to better describe the indirect and cumulative effects of the project, we have enhanced the baseline discussion in the Final EIS, Chapter 3, Watershed and Fish Habitat with a Summary of Watershed Conditions. In this section, we summarize the results of a Sediment Risk Assessment that was published in the Sea Level Timber Sale Draft EIS. We also describe units that were eliminated from consideration in any of the alternatives to meet watershed concerns.

The cumulative effects section of the Final EIS has been expanded with a discussion of measures used to address road failures and sedimentation concerns. The design of harvest units and roads in the Licking Creek project is in accordance with Forest Plan Standards and Guidelines, Best Management Practices, and applicable Forest Service manual and handbook direction. The harvest unit and road cards for the Licking Creek Timber Sale project (Appendix B of the Draft EIS) include specific requirements prescribed to prevent or reduce non-point sediment sources.

See also response to EPA Comment 11.

**EPA 4:**

This project fully implements Forest Plan Riparian Standards and Guidelines and Best Management Practices for road construction. These standards and guidelines and BMPs were designed to meet Forest Plan fish habitat objectives.

**EPA 5:**

We have analyzed a new Alternative 6 in the Final EIS, in response to requests for an alternative that harvested less timber, proposed no new roads, conducted no helicopter harvest, and was economically more viable than the other alternatives. In Southeast Alaska, partial harvest is almost exclusively done with helicopter-yarding methods; therefore, the silvicultural systems were maintained as primarily even-aged. This alternative should provide a basis for comparison.

In addition, for the Final EIS, we conducted a new analysis. We calculated the expected bid values and appraisal costs that result from only harvesting cable-shovel yarded units and holding all helicopter-yarded units in reserve, for all action alternatives. The results are summarized under Opportunities to Improve Economics, in the Silviculture and Timber Management section of Chapter 3 of this Final EIS, and should provide an additional basis for comparison. (The full analysis is displayed in the Timber Resource Report in the project planning record, and is available upon request.)

**EPA 6:**

The Forest Plan Final EIS (1997) and Final Supplemental EIS (2003) provide a detailed analysis of the economic and social environment from a regional standpoint down to the community level. All resources are discussed from timber to fisheries. The Licking Creek project tiers to the Forest Plan. Appendix A of the Licking Creek Draft EIS explained how the project fits into the multi-year timber program on the Tongass National Forest and how the project tiers to the Forest Plan with respect to sustainable timber economics. This appendix has been updated for the Final EIS to reflect the current market demand for the Tongass. We have also clarified the assumptions that were used in the analysis, such as export of Alaska yellow cedar and local processing of other species.

**EPA 7:**

The determination of the optimum silvicultural prescription at the project level is based on site-specific factors (including aesthetics, environmental, biological, engineering, and economic constraints), and will often be influenced by other concerns, such as the difficulty in protecting residual stands through harvest operations on steep slopes, viable sale economics, the desirability of perpetuating spruce, and other forest health concerns (Forest Plan Final EIS, page G-32). The silvicultural

## Appendix B

prescriptions for all units in the Licking Creek project meet Forest Plan Standards and Guidelines. Since the Licking Creek project area has an established road system that is best suited to cable yarding, many of the proposed yarding systems are cable systems. These systems are best suited to even-aged silvicultural systems. Partial-cut cable logging increases the logging costs by 40 percent. Clearcut with reserve prescriptions meet the requirements for the retention of structure and are cost effective from a timber harvest standpoint.

### **EPA 8:**

See responses to EPA Comments 7 and 9.

### **EPA 9:**

The Timber Standards and Guidelines include direction to "Use clearcutting only where such a practice is determined to be the best system to meet the objectives and requirements of Land Use Designations" (Forest Plan, page 4-96). The project area is almost entirely within the Timber Management and Managed Landscape LUDs; the goals and objectives for these LUDs are listed in Chapter 1 of this Final EIS. The Forest Plan encourages the use of other cutting methods when this will meet land management objectives (Forest Plan, p. 3-144). However, the Forest Plan also envisions that clearcutting will continue to be the predominant harvest method on the Tongass, accounting for about 80 percent of regeneration harvests, and 65 percent of all harvests forest-wide (page 5, Forest Plan Record of Decision, 1997). (The 1999 Record of Decision was reversed through litigation. Our current management direction tiers to the 1997 Record of Decision.) A random sample of units conducted on the Tongass in 2001 showed that 29 percent were even aged, 33 percent two aged and 38 percent uneven aged, which is below the Forest Plan forecast of even aged harvest forest-wide (unpublished report, Zaborske, et. al. 2002).

### **EPA 10:**

We evaluated whether to conduct watershed analyses within the project area and determined that they were not needed for several reasons. There is no significant fish habitat relative to production capabilities of other areas within the cataloging unit or watershed association (fifth order hydrologic unit code, HUC5). The composition of channel types consist mostly of high gradient, hard bottomed, transport channels. The resiliency of the stream channels, mostly high-gradient contained or hard bottomed, and low quality in terms of fish production, act to negate the level of concern from the previous harvest level. In other words, there are no significant habitat or populations downstream of sediment sources (transport stream systems).

Although no watershed analysis was completed, the team did consider risks to water quality and fish habitat. A Sediment Risk Assessment was completed for the Sea Level Timber Sale Draft EIS, which encompassed the Licking Creek project area; the results of the assessment are summarized in the Watershed and Fish Habitat section. Areas of high concern were removed from consideration in any alternative. (These are discussed in Chapter 3, Watersheds and Fish Habitat, under Summary of Watershed Conditions.) With the removal of units of concern, harvest of the units proposed in any of the alternatives poses little to no risk to downstream fish habitat. Field reconnaissance and surveys, of every unit considered in each alternative, verified the lack of transport potential to fish habitat. All transport streams with downstream potential effects were buffered in accordance with Forest Plan Riparian Standards and Guidelines, or otherwise excluded from harvest, to prevent effects to downstream fish habitat and maintain channel integrity and function.

See also response to EPA Comment 3.

### **EPA 11:**

The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution. The National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) provide a protection and improvement emphasis for soil and water resources and water-related beneficial uses. Soil and water conservation practices (BMPs) were recognized as the primary control mechanisms for nonpoint source pollution on National Forest System lands. The Environmental Protection Agency supports this perspective in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

The Forest Service must apply Best Management Practices that are consistent with the Alaska Forest Resources and Practices Regulations to achieve Alaska Water Quality Standards. The site-specific application of BMPs, with a monitoring and feedback mechanism, is the approved strategy for controlling nonpoint source pollution as defined by Alaska's Nonpoint Source Pollution Control Strategy (October 2000). In 1997, the State approved the BMPs in the Forest Service's Soil and Water Conservation Handbook (FSH Handbook 2509.22, October 1996) as consistent with the Alaska Forest Resources and Practices Regulations. This Handbook is incorporated into the Tongass Land Management Plan.

A discharge of dredge or fill material from normal silvicultural activities such as harvesting for the production of forest products is exempt from Section 404 permitting requirements in waters of the United States, including wetlands (404(f)(1)(A)). Forest roads qualify for this exemption only if they are constructed and maintained in accordance with best management practices to assure that flow and circulation patterns and chemical and biological characteristics of the waters are not impaired (404(f)(1)(E)). The BMPs that must be followed are specified in 33 CFR 323.4(a). These specific BMPs have been incorporated into the Forest Service's Soil and Water Conservation Handbook under BMP 12.5.

The design of harvest units and roads in the Licking Creek project is in accordance with Forest Plan Standards and Guidelines, Best Management Practices, and applicable Forest Service manual and handbook direction. The harvest unit and road cards for the Licking Creek Timber Sale project (Appendix B of the Draft EIS) include specific requirements prescribed to prevent or reduce non-point sediment sources. Monitoring and evaluation of the implementation of Forest Plan Standards and Guidelines and Best Management Practices would occur. Project activities are expected to meet all applicable State of Alaska water quality standards.

The beneficial uses of the water in the project area default to fish and wildlife resources, as there are no other uses for the water in the project area, such as drinking water, hydroelectric power, or irrigation for agricultural purposes. The Licking Creek project area watersheds are considered of low value in terms of quality fish habitat, based on channel morphology and lack of anadromous fish habitat, coupled with the fact that Alaska Department of Fish and Game reports indicate low sport fishery and commercial fishery values. None of the streams in the Licking Creek project area appear on the State of Alaska's list of water bodies with impaired uses (Clean Water Act, Section 303(d) report).



## Appendix B

01/22/03 00:05 FAX 9072479533

Dick&Judy Coose



### C.A.R.E.

CONCERNED ALASKANS for RESOURCES and ENVIRONMENT

PO Box 9266 - Ketchikan, Alaska 99901

Phone: 907-247-9266

Email: [care@kpunet.net](mailto:care@kpunet.net)

Jerry Ingersoll, District Ranger  
Attn: Licking Creek  
3031 Tongass Ave.  
Ketchikan, AK 99901

January 21, 2003

Dear Jerry,

The following comments are submitted concerning the Licking Creek Timber Sale DEIS.

Of the alternatives put forth it appears Alternative 4 best meets the need to manage for a healthy forest and provide for the local Ketchikan economy.

CARE-1

From my review of the data in the DEIS, I believe more acres could be harvested providing for better sale economics and still providing for the same healthy forest conditions.

CARE-2

The lack of some basic data that I believe is readily available and the organization of the document makes it difficult to easily and fully evaluate the project.

I am concerned with several statements made in the DEIS. The reasons for these concerns is that I have seen no valid science to support them and my personal experience and observations do not support them. The following are a couple of these concerns.

The use of Old Growth Reserves and habitat corridors has no science base. There is no agreement among scientists or biologists that OGR's or corridors have any significant effect in western forests. The Forest Service needs to base management decisions on science and experience and not blindly follow these theories.

CARE-3

The harvest of timber will not reduce deer and wolf habitat unless an area is seriously over harvested in a short period of time. The harvest of timber is a useful management tool to provide and maintain the variety of habitat needed by wildlife species. Most forest lands never reach their potential to produce deer because of the lack of habitat diversity.

CARE-4

Several of the statements in the document regarding past timber harvest and fish habitat in the area support my experience that timber harvesting when done correctly does not significantly impact fish habitat. Also, studies in the Pacific Northwest show streams with some landslides are more productive than those without.

CARE-5

I would suggest provide all volume figures in MBF, this is the measurement most people understand.

CARE-6

Sincerely,

Dick Coose  
Executive Director



**Forest Service Response to Concerned Alaskans for Resources and Environment:****CARE 1:**

Each action alternative represents a different means of satisfying the project purpose and need, by responding with different emphases to the key issues discussed in Chapter 1. A summary of the effects of each action alternative is displayed in Chapter 2 under Comparison of Alternatives. Forest health and project economics will be considered by the decision maker in selecting an alternative, along with other factors such as environmental effects on other resources.

**CARE 2:**

The IDT developed a unit pool that was outside of Inventoried Roadless Areas and any roadless area subject to the Roadless Area Conservation Rule. In addition to this constraint, some units in the original unit pool were dropped for various resource concerns. As a result, much of the suitable timber base was not included in the formulation of alternatives.

**CARE 3:**

The Old-growth Reserve strategy is part of the Forest Plan, and any proposed changes to the strategy will be addressed during the Forest Plan revision process.

**CARE 4:**

Although deer do use recently harvested areas, the decreases in habitat referred to in the Draft and Final EIS are related to the most recent version of the deer habitat capability model. This model analyzes the value of habitat for deer in the winter. Winter is considered the most difficult season for deer populations because of the difficulty in finding forage. Therefore, areas that receive less snow are considered to be of higher value. Harvested areas tend to accumulate snow and receive a lower value than those areas with large trees. In addition, the Draft EIS projects what the effects might be in the future (over the length of the rotation). Harvested areas have some value for deer associated with the increase in forage. However, when canopy closure occurs approximately 25 years after harvest, forage production drops significantly due to the lack of sunlight reaching the forest floor. At this point, the habitat value for deer goes almost to zero. Some of the "negative" effects in the Draft EIS are related to this future condition.

Deer are the principal prey for the wolves in Southeast Alaska. Although wolves use a wide variety of habitats, they tend to concentrate in areas with abundant prey. The wolf analysis in the document references the anticipated deer changes to help determine possible effects on the wolf population. The changes estimated for the wolves are directly related to those predicted for the deer, as explained above.

**CARE 5:**

Forest Plan Standards and Guidelines were designed to ensure that timber harvest does not significantly impact fish habitat. These have been fully incorporated into the Licking Creek project design.

**CARE 6:**

Since the Forest Service is currently mandated by Congress to sell timber on a CCF basis, we have displayed our analysis in CCF. Using a factor of 2 is an approximate conversion between MBF and CCF. For example, if a timber sale volume consists of 12,000 CCF, the MBF approximate equivalent would be calculated as follows: 12,000 CCF divided by 2 is 6,000 MBF or 6 MMBF. The harvest cost conversion from CCF to MBF could also be approximated using a factor of 2. For example, if the logging cost/CCF for a particular timber sale are \$130.64/CCF then those costs converted to approximate costs/MBF would be calculated as follows:  $\$130.62 \times 2 = \$261.80/\text{MBF}$ .

On page S-4 of the Draft EIS, the proposed harvest volumes by alternative are displayed in both CCF and MMBF. Additional references to MBF have been made in the Final EIS.

### KETCHIKAN GATEWAY BOROUGH

---

Office of the Borough Manager, 344 Front Street, Ketchikan, Alaska 99901

Roy Eckert, Manager

Phone: 907-228-6625

Fax: 907-247-6625

Email: mgr@borough.ketchikan.ak.us

February 3, 2003

Jeremiah Ingersoll, Director  
Ketchikan-Misty Fjords Ranger District  
3031 Tongass Avenue  
Ketchikan, AK 99901

**RECEIVED**

FEB 04 2003

Ketchikan-Misty Fjords  
Ranger District

**RE: Comments, Licking Creek EIS**

Dear Jerry,

The Ketchikan Gateway Borough ("KGB" or "Borough") has reviewed the Licking Creek EIS. The KGB has considered the issues raised to date and offers the following comments for the record.

The KGB, a second class Borough and municipality organized under the laws of the State of Alaska, is located in the Tongass National Forest. Ours is a timber-dependent community and a recipient of timber receipt revenues pursuant to 16 U.S.C. § 500. KGB residents engage in varied activities within the Tongass National Forest. These include commercial timber harvesting and recreation activities such as hiking, camping, fishing, hunting and personal use timber extraction.

As a general matter, the KGB supports the proposal to harvest timber from the Licking Creek project area. The KGB believes that the Forest Service should make the maximum utilization of timber sale opportunities in areas of the Tongass that were designated Timber Production by the recently revised Tongass Land Management Plan so that manufacturing facilities in Ketchikan and elsewhere in Southeast Alaska have an opportunity to purchase sufficient timber to meet their needs. Furthermore, the KGB urges the Forest Service to design timber sale projects such as the Licking Creek Project to ensure that resulting timber sales return sufficient value over costs to be attractive to the industry.

The Ketchikan Gateway Borough generally supports the offering of timber sales essential for maintenance of a timber industry in Southeast Alaska. The Licking Creek area offers an opportunity to improve the viability of the timber industry in Southeast Alaska, but will likely require some adjustment.

Regarding specific components of the EIS, the Borough makes the following comments:

1. Regarding harvested areas, the cumulative effects of harvest will change some of the habitat, but that change can be beneficial for deer browse. It is not necessarily accurate to list wildlife impacts as "reductions", some wildlife may experience increases.

KGB-1

2. The EIS as a whole has marginal or negative net value. In order to lower the cost of harvesting the timber, and thus make the sale more economic, trees which must be left in the units should be left along the boundaries or in clumps located where it will not cause additional costs. | KGB-2
3. The OGR strategy should really be revisited in view of the large portion of the forest which is not available for timber use. | KGB-3
4. There should be a maximum timber harvest alternative. An adequate timber supply is the single largest impediment to maintaining and restoring a viable timber industry here in Alaska. | KGB-4
5. It is not clear that all sedimentation in streams is bad. The streams must have some sedimentation to support salmon. Increases may be beneficial to fish habitat in some areas. | KGB-5
6. In order to sustain a viable manufacturing industry we need a reliable supply of economic timber at a level of about 360 MMBF annually. Since the harvest on the Tongass for the last few years has been constrained to very low levels, there is adequate room within the decadal ASQ to ramp up to that level beginning immediately. We request that you do so. | KGB-6

Thank you for your consideration of the Borough's comments.

Sincerely,



Roy Eckert  
Borough Manager

c: Borough Mayor and Assembly  
Borough Attorney



## Appendix B

### Forest Service Response to Ketchikan Gateway Borough:

#### KGB 1:

Forest Service Manual 2670 requires that viable populations of plant and animal species be maintained and that actions which may cause a species to become threatened or endangered be avoided. Those species using forested habitats are more affected (i.e., at risk) by harvest than those species that use openings, so the analysis in the Draft EIS focuses on forest dwellers. The deer, wolf, and marten were discussed in detail in the Draft EIS because they are considered Management Indicator Species (MIS) which are used to generally represent a wider range of species using forested habitats.

Although deer do use recently harvested areas, the decreases in habitat referred to in the Draft EIS are related to the most recent version of the deer habitat capability model. This model analyzes the value of habitat for deer in the winter. Winter is considered the most difficult season for deer populations because of the difficulty in finding forage. Therefore, areas that receive less snow are considered to be of higher value. Harvested areas tend to accumulate snow and receive a lower value than those areas with large trees. In addition, the Draft EIS projects what the effects might be in the future (over the length of the rotation). Harvested areas have some value for deer associated with the increase in forage. However, when canopy closure occurs approximately 25 years after harvest, forage production drops significantly due to the lack of sunlight reaching the forest floor. At this point, the habitat value for deer goes almost to zero. Some of the “negative” effects in the Draft EIS are related to this future condition.

Deer are the principal prey for the wolves in Southeast Alaska. The wolf analysis in the document references the anticipated deer changes to help determine possible effects on the wolf population. The changes estimated for the wolves are directly related to those predicted for the deer, as explained above.

The marten analysis also refers to habitat changes. High-value marten habitat is defined as high-volume stands below 1,500 feet in elevation. Harvest in this habitat is reflected in the numbers presented in the wildlife section of the document. Only those acres of harvest considered to be high-value marten habitat are discussed in the marten section - not all of the harvest taking place in the project causes a decline in this habitat.

#### KGB 2:

On page 3-9, Table 3-3 of the Draft EIS, the advertised rate/CCF is displayed for each of the action alternatives. Only Alternative 4 has a positive value. It is important to realize each alternative is analyzed independently as a stand-alone alternative and the alternatives are not combined in terms of “the EIS as a whole”.

Only 9 acres of cable ground are prescribed for group selection. Group-selected stands are windfirm. This prescription occurs in the eastern portion Unit 19 to mitigate visual concerns from Carroll Inlet. Trees that are required to be left to meet Marten Standards and Guidelines may be, according to the Forest Plan (pg 4-119) “clumped for operational concerns or ecological opportunities”.

The majority of the harvest units retain timber in clumps located where they will not cause additional cable-logging costs. All helicopter units will retain some trees for either wildlife, visual or economic reasons. Retaining the less-economic species or less-economic diameter classes in some species can help in reducing helicopter-yarding costs.

#### KGB 3:

The Old-growth Reserve strategy is part of the Forest Plan, and any proposed changes to the strategy will be addressed during the Forest Plan revision process.

#### KGB 4:

The rationale for eliminating this alternative from further consideration is given in Chapter 2 of this Final EIS. The IDT developed a unit pool that was outside of Inventoried Roadless Areas and any roadless area subject to the Roadless Area Conservation Rule. As a result, much of the suitable timber base was not included in the formulation of alternatives, and a maximum timber harvest alternative for the entire project area was not considered.

#### KGB 5:

Increased sedimentation resulting from logging activities are not necessarily beneficial to streams. State and federal regulations, as well as Forest Plan Standards and Guidelines, require the Forest Service to maintain existing water quality.



This project includes mitigation specifically designed to maintain stream temperatures and minimize erosion and sedimentation.

**KGB 6:**

Appendix A of the Licking Creek Final EIS displays how the Forest Service develops expectations about future timber markets and demand over the planning cycle and how the Forest Service documents demand on a project by project basis through the development of the Ten Year Timber Sale Schedule. The Forest Plan limits timber volume to an Allowable Sale Quantity of 267 MMBF annually. Changing the Allowable Sale Quantity is a Forest Plan issue and beyond the scope of this project.

## Appendix B

4 Dec. 2002

### Comments on DEIS

1. It is unclear what timber product mills exist, and what kind and volume of timber is needed. | Hays-1
2. Since closure of the pulp mill, where is the market for pulpgrade logs? | Hays-2
3. Where is the market for sawlogs? | Hays-3
4. What is the cost of USFS operations, ie all costs, vs Returns if any, from the timber sale program? The DEIS does not spell out points 1-4. | Hays-4

Hank Hays  
Ktn RD-DFR  
1960-64

Hays  
460 Weaver Rd. NW  
Rainbridge Is., WA 98110

**Forest Service Response to Hank Hays:****Hays 1:**

Sawn wood products for the domestic market are now the principle products manufactured in Southeast Alaska. The Pacific Log and Lumber sawmill is currently operating in Ketchikan, with a potential capacity of 33,600 MBF. Additional mills are in operation on Prince of Wales Island (total capacity of 131,875 MBF), Wrangell (65,000 MBF), and Petersburg (23,000 MBF). The Ketchikan Gateway Borough purchased the Gateway Forest Products veneer plant (capacity of 30,000 MBF) and is currently looking for an operator. The two mills on Annette Island, and Herring Bay Lumber Company in Ketchikan, are currently idle. This information has been added to the Timber Economics section of Chapter 3, under Employment in the Project Area.

Appendix A of the Licking Creek Final EIS explains how this and other timber sale projects fit into the multi-year timber program on the Tongass National Forest and how demand is calculated. This demand is expected to average 168 MMBF per year for 1997-2010. The suitable and available land base on the Tongass is capable of supporting an Allowable Sale Quantity of 267 MMBF annually.

**Hays 2:**

With closure of the large pulp mill in Ketchikan (1997), there is no local market for small logs or wood chips. Currently there is a market for small-diameter Western red cedar for domestic export. The lack of a local market for chips has also resulted in an increase in applications to export low-grade round Sitka spruce and western hemlock logs. Export permits are based on the availability of local markets, on a case-by-case basis at the request of the purchaser, and export requires approval by the Regional Forester.

**Hays 3:**

See also response to Hays Comment 1. Sawlogs are manufactured for dimensional lumber and other products, primarily for the domestic (contiguous lower 48 states) market. Currently, about 25 percent of Alaska yellow cedar, 50 percent western red cedar, and 75 percent of Sitka spruce and western hemlock is processed in Southeast Alaska (1998-2002 data), with the remainder exported (Wilson 2003).

**Hays 4:**

The Timber Economics section in Chapter 3 of the Draft and Final EIS includes a Timber Financial Efficiency Analysis and a Financial Efficiency Summary, which display the direct costs and benefits of the Licking Creek project. An updated economic analysis of the timber sale program across the Tongass National Forest is given in the Forest Plan Supplemental EIS 2003, under Economic and Social Environment.



## United States Department of the Interior

OFFICE OF THE SECRETARY  
Office of Environmental Policy and Compliance  
1689 C. Street, Room 119  
ANCHORAGE, ALASKA 99501-5126

ER 02/1110

January 13, 2003

Mr. Jerry Ingersoll, District Ranger  
ATTN: Licking Creek  
U. S Forest Service  
3031 Tongass Avenue  
Ketchikan, Alaska 99901

Dear Mr. Ingersoll:

The Department of the Interior has reviewed the U.S. Forest Service's October 2002 Licking Creek Timber Sale Draft Environmental Impact Statement (EIS).

The proposed timber sale is located in an area on Revilla Island that has been heavily impacted by past logging activities. The area has no old growth reserves and does not provide valuable habitat for the Department of the Interior's trust resources. Therefore, we have no comments on the draft EIS.

If you have any questions, please call Steve Brockmann, Juneau Fish and Wildlife Field Office, 907-586-7487. We appreciate the opportunity to review this document.

Sincerely,

Pamela Bergmann  
Regional Environmental Officer - Alaska

RECEIVED  
JAN 13 2003  
Ketchikan-Misty Florda  
Ranger District



(No Forest Service Response needed to U.S. Department of Interior)



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

JCS

March 7, 2003

Mr. Jerry Ingersoll  
District Ranger  
U.S. Forest Service  
3031 Tongass Avenue  
Ketchikan, Alaska 99901

ATTN: Ricardo Sainz

RE: Licking Creek Timber Sale Draft Environmental Impact  
Statement (DEIS) Comments

Dear Mr. Ingersoll:

The National Marine Fisheries Service (NMFS) has reviewed the referenced DEIS and Essential Fish Habitat (EFH) assessment. NMFS agrees with your conclusion that the project may adversely affect EFH, and that the appropriate measures to minimize those effects are the use of the Tongass Land Management Plan Standards and Guidelines (including 100 foot minimum buffers on all anadromous and high value resident fish streams) and Best Management Practices. We have no additional EFH Conservation Recommendations beyond these measures.

Please direct any questions you may have regarding these comments to Linda Shaw at (907) 586-7510.

Sincerely,

James W. Balsiger  
Administrator, Alaska Region

cc: EPA, Juneau  
ADEC, AADGC, ADNR, ADF&G, USFWS, Juneau  
ADF&G, Ketchikan  
Steve Kokkinakis, NOAA, Washington DC



(No Forest Service response needed to National Marine Fisheries Service)



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Licking Creek; photo by Ricardo Sainz

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# **Appendix C**

## **Subsistence Hearing Transcript**



# 2. Session

The following text is extremely faint and illegible. It appears to be a list or a series of paragraphs, but the content cannot be discerned. The text is centered on the page and occupies most of the lower half.

# Appendix C

## Subsistence Hearing Transcript

### Background

The Forest Service held a subsistence hearing for the Licking Creek Timber Sale in Saxman on January 8, 2003, during the public comment period for the Draft EIS. Two individuals testified at the hearing.

The Forest Service is required to hold subsistence hearings under ANILCA Section 810 if it is determined that the Proposed Action "may impose a significant possibility of a significant restriction on subsistence resources or uses." Such a finding requires that the Proposed Action 1) be modified to remove the significant restriction, 2) be dropped, or 3) proceed with the stipulation that formal subsistence hearings be held and subsequent findings published.

A "significant restriction on subsistence uses" means the Proposed Action can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents.

For all subsistence resources in WAA 406 or the Licking Creek project area, it is not expected that project-related actions, alone or in combination with reasonably foreseeable future activities, would cause a significant possibility of a significant restriction in subsistence resources or uses.

The Forest Plan Final EIS provided a comprehensive analysis of subsistence resources and potential effects of management activities for both the Tongass National Forest and for each rural community in Southeast Alaska. That analysis concluded that subsistence use of deer might be significantly affected by implementation of the timber sale program across the entire Tongass National Forest (Forest Plan, Final EIS, p. 3-224 to 3-229). For this reason, the Forest Service will conduct subsistence hearings for all upcoming timber sale EISs, regardless of the individual project finding of significant or insignificant impacts.

The only two rural communities with documented subsistence uses of Carroll Inlet, including the project area, are Metlakatla and Saxman (Forest Plan, Final EIS, p. 3-605 and 3-641). (Comments were also received during consultations with tribal governments that individuals from Prince of Wales Island might also hunt deer in Carroll Inlet.) No significant concerns about subsistence resources were identified during consultation with tribal governments or during public scoping, and the Licking Creek project area was not reported as a highly significant area for subsistence uses in the Forest Plan. During consultations, Metlakatla mayor Victor Wellington said that the Licking Creek project area was not an area of concern for subsistence uses by their community.

### Saxman Subsistence Hearing Testimony

The Licking Creek project area receives some use from Saxman residents. James Stanley stated that this is not a high-use subsistence area. Willard Jackson discussed his family's history of subsistence hunting and fishing in the Carroll Inlet area, and the fact that different families had land rights to specific areas there. He also discussed the continued importance of the natural resources of deer and fish and recreation opportunities in Carroll Inlet. He generally supported logging, but recommended that logging entries be spread out over a wide enough area and a sufficient period of years to reduce impacts to salmon streams and spawning grounds for shrimp (in the tidelands).

## Appendix C

### Subsistence Hearing Sign-in Sheet

Name	Organization	Page
James Stanley	Saanya-Kwaan, Tei Kwedei	C-6
Willard Jackson	ANB #14	C-6



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PUBLIC HEARING  
KETCHIKAN, ALASKA  
LICKING CREEK  
Subsistence Hearing  
January 8th, 2003  
6:00 p.m.  
Cape Fox Corporate Offices  
2851 South Tongass Avenue  
Hearing Officer: Kathy O'Connor

24 JUDY A. ZENGE  
25 Sealaska Business Services  
525 Monroe Street  
Ketchikan, Alaska 99901  
907-225-5252

P R O C E E D I N G

HEARING OFFICER: Okay. I will open the formal hearing at this time. Good Evening, this is a Subsistence Hearing to receive testimony on the alternatives proposed in the recently published Licking Creek Timber Sale Environmental Impact Statement.

This is an opportunity for you to provide testimony about the effects of the alternatives on subsistence uses and related economic and social effects on your community. Or about other aspects of the draft EIS. My name is Kathy O'Connor and I will serve as the Hearing Officer for this proceeding. I want to thank you all for coming. The intent of this hearing is to make an official record of your testimony regarding the draft EIS. We appreciate your interest, and effort to be here, and want to assure you that we will do our part to listen, and record your testimony. For the record today is January 8th 2003, and the time is 6:33 p.m., this hearing is being held in Saxman Alaska, at the Cape Fox Corporation Office, at 2851 South Tongass Avenue.

Public notification of the Hearing was made by publications in the Ketchikan Daily News, and notices posted on community bulletin boards in Ketchikan and Saxman. Additionally notification was made to council members of the Ketchikan Indian Corporation, the Organized Village of Saxman, and Metlakatla Indian Community.

1       There are some procedures I would like to mention, this  
2 hearing is scheduled to run until 8:00 p.m. If testimony is  
3 completed earlier we will keep the record open until 8:00 p.m.  
4 to allow others to testify. And what we'll probably do is  
5 recess, and then if we have additional people, then we will  
6 reopen. If you haven't already done so, please sign in at the  
7 door and indicate if you would like to present testimony. If  
8 individuals have the same testimony as others the presenter can  
9 simply state that they stand with Presenter X or Presenter Y.  
10 Also written testimony is just as acceptable as an oral  
11 presentation. Also formal public comments on the draft EIS  
12 will be accepted until January 21st, 2003, which is when the  
13 public comment period is scheduled to close. We are recording  
14 this hearing so that we can prepare a transcript, along with  
15 all other public comment, and testimony, the transcript will be  
16 used by the Forest Service during the preparation of the final  
17 environmental Impact Statement, and record of decision for the  
18 Licking Creek Timber Sale. An opportunity to discuss and  
19 obtain information about the draft EIS, and the various  
20 alternatives was provided during the question and answer period  
21 that preceded this hearing. We will not be taking questions  
22 during the formal hearing. Testimony will taken in the order  
23 received on the sign in sheet. When I call your name please  
24 come forward. Give me any written testimony you may have,  
25 state your name and affiliation if appropriate and proceed with



STANLEY TESTIMONY

1 your testimony.

2 The testimony tonight will be given by James

3 JAMES STANLEY

4 testified as follows:

5 My name is James Stanley I represent (Native words). At this  
6 particular time I would be speaking on behalf of my (Native  
7 word) Martin Perez, and to my understanding is that he has  
8 already given his testimony, I would agree what he says since I  
9 would be speaking on his behalf.

10 Also I'm not very familiar with the plan itself. I do  
11 know it's somewhat of a lower subsistence area, meaning not  
12 high use. And we should probably be okay with it. I guess  
13 that would be following with what Martin Perez Senior would say  
14 and he has already given his view. Thank you.

15 HEARING OFFICER: At this time we have no others to present  
16 testimony so we will go into recess, again we will be hear  
17 until 8:00 p.m. It is 6:37 p.m. and we are going into recess  
18 now.

19 (Off record)

20 HEARING OFFICER: The time is 7:25 and we are reopening the  
21 formal hearing, the next person to give testimony tonight is  
22 Willie Jackson.

23 WILLARD JACKSON

24 testified as follows on:

25 Well first of all I want to say good evening to the Forest



## JACKSON TESTIMONY

1 Service Employees. My name is Willard Jackson, I'm from the  
2 Tongass tribe I'm (Native Language), I'm brown bear. My mother  
3 is Esther Shea, my father is Melton Jackson of Klukwan. Over a  
4 period 50 years I've had the opportunity to hunt and travel the  
5 great big beautiful Inlet of Carroll Inlet. Particularly when  
6 I was 16 as a -- on a Seine boat. On the mouth of it, as you  
7 go up in the Carroll Inlet, you're going to run into -- they  
8 call Kegan, Kegan Creek. But there's an area where Saxman and  
9 Tongass people would often times go up and do some subsistence  
10 fisheries during the coho season. I hunted this area, when I  
11 was a teenager with my brother Melton Jackson Jr. and we'd go  
12 to the different families that had land rights -- with the  
13 smoke houses were boundary areas for families where they had  
14 their summer fishery, where'd they'd go and fish the summer,  
15 bring the family up and fish it, and smoke their fish, and dry  
16 their fish, and prepare it for the winter. There was shrimp up  
17 in there, and I seal hunted that area when I was awful young,  
18 13, 14, 15 years old, out on a 17 foot open skiff with a 60  
19 horse on it. I'd travel up and down that area, and I'd sleep  
20 up at the very mouth of it, and travel back out. And there was  
21 a bounty on seals at that time \$10, \$10 for the nose, and I'd  
22 roll the seal skin up skin inside, meat on the outside, and  
23 salt it down and bring it back home, and salt it in a barrel  
24 and go back up and do the same thing up there in Carroll Inlet  
25 and Thorne Arm, and -- so I spent a long time -- a lot of times

## JACKSON TESTIMONY

1 in Carroll, because it was so well protected. Our ancestors,  
2 my grandparents used to travel up there to hunt, to process  
3 shrimp, halibut, and hit the creeks throughout the season,  
4 during the summer and fall, and come back out when they were  
5 done and they'd leave the smoke house as their -- smoke houses  
6 are gone now, all your smoke houses throughout southeast were  
7 taken down because it showed a family tie to the land. All  
8 land in this area we're talking about, (Native), Cape Fox and  
9 you're talking (Native) Tongass, you don't see any Tsimshian  
10 territory in here because Tsimshian didn't come in till the  
11 early 18 -- 1861, 1862, when Father Duncan brought them on this  
12 side from Old Metlakatla. Their ties came later, when they got  
13 established on the island. But in looking at a lot of this  
14 land, you're looking at in Carroll Inlet, George Inlet, Thorne  
15 Arm, you're talking bear. Bear, bear territory, which is  
16 connected also to (Native word) and (Native word), history.  
17 When we look at this particular area we look at the forest, and  
18 all that it has given us over the 150 years that we can  
19 remember -- that my mother can remember when she was growing up  
20 with her mom, the stories my mother Alice Harris would tell  
21 her, the stories of the migration from Tongass Island and Cape  
22 Fox to the Saxman where we're at. And we're sitting in the  
23 Cape Fox Corporation building now, in the conference room.  
24 We're sitting in a place that's Indian and Eskimo ran. It's  
25 actually a reserve just like Metlakatla, but it's no longer

## JACKSON TESTIMONY

1 called that. But this particular piece of land, this real  
2 estate, is a beautiful area. It's an area I hope that in the  
3 future when they do log it, they don't all log it at one time,  
4 because we may not see the shrimp back there again if we log it  
5 too much or too fast. We may not see the streams anymore  
6 filled with our cohos, or sockeye, or even our humpy. It's an  
7 area where you often find some hunters get lost when they go in  
8 the Thorne Arm they come across and they get lost in the  
9 mountain side and end up in Carroll Inlet. But it's still an  
10 area where people like to go and hunt. There's still deer back  
11 in there, deer are starting to multiply back there again, it's  
12 also a recreational area for some of our summer fisheries,  
13 sport fisherman go up there with their families. My feelings  
14 on logging are, my intentions are good, and if we're going to  
15 log this area, this particular area, are we going to do it over  
16 a one year period, or are we going to log that over a five, or  
17 a 10 year period, or are we going to log it one year, and let  
18 it settle, or are we going, or are your plans are to log that  
19 for a period of five years. If it -- my feelings are if it's  
20 going to be logged over a five or a six year period, we're  
21 going to lose some of these streams in that area, where some  
22 people go to harvest their salmon for their season, and some of  
23 us go up there to shrimp and some of your elder fisherman go up  
24 there to drop their hooks in the middle there in the spring  
25 time too. It's a beautiful area, it's a beautiful recreational



## JACKSON TESTIMONY

1 area. And my feeling are, that I would like to see some  
2 logging happening but I wouldn't like to see a long period of  
3 it. You know maybe spotted here and there, you know to  
4 hopefully keep the areas open in the water front there, to  
5 where you're not getting to much drift or bark into the area  
6 where it would one, kill the stream, and two, kill the spawning  
7 ground for the shrimp.

8 Other than that I'm glad to be here, Carroll Inlet brings  
9 back many memories when I was a young man, you know wondering  
10 what the other side of the world was doing when I was up in  
11 there in the dark. But now I know the area, I've learned to  
12 appreciate it. And I often times just make a trip up there,  
13 just to go up and look at it, to go down memory lane. So to  
14 the Forest Service, and the Forest Service Management, I hope  
15 that when you do harvest that you do it in a respectful way,  
16 we're dealing with Mother Earth, we all go back to Mother  
17 Earth, we all respect the forest as Tlingit People. I told a  
18 gentlemen here earlier Tlingit people are water people we live  
19 off the water, but we're also connected to the land. Anything  
20 we do to harvest anything, we're also giving thanks to (Native  
21 word) Everlasting One, Creator. And I thank you for allowing  
22 me to be here to testify, and I hope in the future that we can  
23 continue to sit and talk in this fashion. It's good for all of  
24 us, and most important of all it's good to know that our  
25 testimonies are being heard because I stand here representing



1 my grandchildren, my grandmother stood up and testified for her  
2 grandchildren, now I'm one of them and I'm just following  
3 through with our ancestral ways, we are who we are, and we'll  
4 continue to be who we are. Thank you.

5 HEARING OFFICER: The time is 7:35 p.m. and we will once  
6 again go into recess.

7 (Off record)

8 HEARING OFFICER: At this time I'm going to close the  
9 subsistence hearing it is 8:14 p.m.

10 (Off record)

11 (END OF TAPE)



KMRD file photo

# **Appendix D**

## **Biological Assessment Biological Evaluation**





# Appendix D

## Biological Assessment and Biological Evaluation: Threatened, Endangered and Sensitive Species

Prepared By: Ricardo G. Sainz, Fisheries Biologist  
Ketchikan-Misty Fiords Ranger District  
Tongass National Forest, And

Karen L. Dillman, Botanist  
Ketchikan-Misty Fiords Ranger District  
Tongass National Forest

Approved By: /s/ Todd Tisler  
Todd Tisler  
Fish and Wildlife Staff Officer  
Ketchikan-Misty Fiords Ranger District  
Tongass National Forest

Date: 11-20-01

## Introduction

This combined Biological Assessment (BA) and Biological Evaluation (BE) was prepared for the Licking Creek Timber Sale as required by Section 7 of the Endangered Species Act (ESA), as amended, and the USDA Forest Service Threatened, Endangered and Sensitive Plant and Animal Species Policy (FSM 2670). This document describes the occurrence of and project effects on species that are Federally listed or proposed for threatened or endangered status. This document also serves as a BE by including equivalent information on Forest Service sensitive species. The BE is not required under the ESA, but is required by the Forest Service for all internal programs and activities (FSM 2672.4).

The Licking Creek Timber Sale area is located on central Revillagigedo Island, approximately 18 miles northeast of Ketchikan, on the east side of Carroll Inlet between Licking and Marble Creek drainages, in VCU 7460, see the Licking Creek Timber Sale Environmental Impact Statement [EIS] for detailed units locations and maps). The action alternatives propose to harvest about 20.6 MMBF of commercial timber in 965 acres of the Licking Creek area. The action alternatives would require new road construction of 7.4 miles and reconstruction of up to 33.2 miles of road. The sale would use existing log-transfer facilities (LTFs) at Shoal Cove. No new LTFs are required.

The Licking Creek project is located entirely within the boundaries of the area analyzed in the Sea Level Timber Sale EIS (USDA Forest Service 1999a). The Sea Level Record of Decision was signed on May 3, 1999 (USDA Forest Service 1999b). The findings in this document, for wildlife and fish species are based largely on those reported in the Sea Level BA/BE and on analyses and inventories presented in the Sea Level EIS.

## Lists of Species Covered in this Document and Finding for Each Species

Threatened and endangered species potentially occurring in the project area were identified through consultation with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Consultation correspondences are located in the Licking Creek project planning record at the Ketchikan-Misty Fiords Ranger District. Table 1 lists the threatened and the endangered species that may occur in or near the project area and summarizes the findings of this document.

**Table 1. Threatened and Endangered Species that May Occur in or Near the Licking Creek Project Area**

Common Name	Scientific Name	ESA Status	Summary of BA/BE Finding
Humpback whale	<i>Megaptera novaeangliae</i>	Endangered	No effect
Snake River sockeye salmon	<i>Onchorhynchus nerka</i>	Endangered	No effect
Upper Columbia River spring chinook salmon	<i>Onchorhynchus tshawytscha</i>	Endangered	No effect
Upper Columbia River steelhead	<i>Oncorhynchus mykiss</i>	Endangered	No effect
Steller sea lion	<i>Eumetopias jubatus</i>	Threatened	No effect
Snake River Basin steelhead	<i>Oncorhynchus mykiss</i>	Threatened	No effect
Lower Columbia River steelhead	<i>Oncorhynchus mykiss</i>	Threatened	No effect
Upper Willamette River steelhead	<i>Oncorhynchus mykiss</i>	Threatened	No effect
Middle Columbia River steelhead	<i>Oncorhynchus mykiss</i>	Threatened	No effect
Lake Ozette sockeye salmon	<i>Oncorhynchus nerka</i>	Threatened	No effect
Snake River spring/summer chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
Snake River fall chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
Puget Sound chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
Lower Columbia River chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
Upper Willamette River chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect

The Forest Service has identified sensitive plant and animal species that could potentially occur in or near the project area. Table 2 lists sensitive species that may occur in the project area and summarizes the findings of this document.

Table 2. Alaska Region Sensitive Species that May Occur in the Licking Creek Project Area

Common Name	Scientific Name	Summary of BA/BE Finding
Queen Charlotte goshawk	<i>Accipiter gentilis laingi</i>	May affect individuals; not likely to adversely affect population viability
Trumpeter swan	<i>Cygnus buccinator</i>	Not likely to adversely affect
Peale's peregrine falcon	<i>Falco peregrinus pealei</i>	No effect
Osprey	<i>Pandion haliaetus</i>	No effect
Goose-grass sedge	<i>Carex lenticularis</i> var. <i>dolia</i>	No effect
Edible thistle	<i>Cirsium edule</i>	No effect
Davy mannagrass	<i>Glyceria leptostachya</i>	Not likely to adversely affect
Wright filmy fern	<i>Hymenophyllum wrightii</i>	May effect
Truncate quillwort	<i>Isotes truncata</i>	No effect
Calder's lovage	<i>Ligusticum calderi</i>	Not likely to adversely affect
Bog orchid	<i>Platanthera gracilis</i>	No effect
Loose-flowered bluegrass	<i>Poa laxiflora</i>	Not likely to adversely affect
Unalasaka Mist-maid	<i>Romanzoffia unalaschensis</i>	No effect
Queen Charlotte butterweed	<i>Senecio moresbiensis</i>	Not likely to adversely affect

## Field Surveys

### Botanical Surveys

#### PRE-FIELD REVIEW OF EXISTING INFORMATION

A pre-field review of existing information concerning the plants listed above was conducted for the project area. This review included: the Regional Forester's Sensitive Species List, Alaska Natural Heritage Program (AKNHP) data base records, and botanical literature (titles are listed in the references section of the botanical report), consultation with Mary Stensvold, the Alaska Regional Botanist, and other FS biologists, and a review of proposal details, maps, air photos, GIS information, and previous management activities.

Field assessment for the Sea Level project area began in 1994. All Sea Level harvest units were visited by one or more field crews including stand exam, wildlife, archeology, fisheries, soil survey, and unit reconnaissance crews. Many of these field personnel had knowledge of plants. Field crews were equipped with sensitive plant identification cards and asked to report any sensitive plants seen during the course of their duties. This method is generally ineffective at locating rare plants. In addition, a nonbotanist surveyor conducted six cursory plant surveys in 1996.

A more intensive survey was undertaken in 1997 during which a botanist conducted 16 surveys, assessing 15 proposed Sea Level harvest units and 1.5 miles of proposed road. During prefield review, units and roads were selected for surveying according to two criteria: (1) units and roads were prioritized based on their greater probability for harvest, and (2) aerial photos were then examined for high-likelihood sensitive plant habitats in and adjacent to the units and roads. Surveys followed the protocol described by Krosse, et al. (1998), drafted in 1997, which calls for use of the "intuitive controlled" survey method, the standard method for botanical surveys on National Forest Lands. The detailed methods and results of botanical surveys, along with survey routes, can be found in the planning record for the Sea Level FEIS (Woolwine, 1997). Additionally, a sensitive plant survey of the Licking Creek harvest units was completed in September 2000 (Grundy 2000). The Alaska Region of the Forest Service and The Nature Conservancy's Alaska Heritage Program have developed a list of rare plants known to occur on the Tongass National Forest. Two Sensitive species (*Glyceria leptostachya* and *Carex lenticularis* var. *dolia*) and two rare species (*Listera convallarioides*, and *Mimulus lewisii*) were located within the sale area. The rare orchid *Listera convallarioides* was found in the sale areas of both the Sea Level and Buckdance Timber Sales on West side of Carroll Inlet, VCU 746, central Revillagigedo Island.

Between 20 June and 10 August 2000 the botanist, Karen Dillman, conducted eleven **Level 3 and 4** intensity sensitive plant surveys. The surveys took place at the appropriate time of year to identify all Sensitive plants.

The objective of goshawk surveys in the project area was to locate goshawk nest sites. Knowledge of nest site locations allows for goshawks to be more accurately considered during project alternative development and analysis. Standards and Guidelines will be applied to any discovered nests.



### Goshawk Surveys

Goshawk surveys followed the protocol established for the Alaska Region Goshawk Inventory Protocol, first issued June 24, 1992. Areas with reported goshawk sightings were the first priority for surveys. Sightings ranged in confidence level from low to high. Some reports were for raptors in general. Wildlife crews usually investigated these sightings, if possible, because we felt even a slight possibility of observing a goshawk increased the chances of finding a nest. Reports of sharp-shinned hawks and red-tail hawks were not normally pursued.

Surveys also included time spent observing from vantage points (Crocker-Bedford 1997). If the protocol station fell at a good vantage point, field crews would often spend 30 minutes or an hour sitting and looking for goshawks. We felt this increased our chances of spotting a goshawk. If a goshawk was spotted, we could then concentrate our surveys in that direction. While this method is the best available at this time, it does not guarantee that all nests will be found. In fact, we suspect some nests may not be found, even if the surveys are conducted close to the nest.

From 1993 to 2000, field crews completed surveys along 87 routes that included 512 broadcast stations within the Sea Level project area. Approximately 387 call stations were located in or adjacent to potential Sea Level harvest units. Field crews found no goshawk nests, but recorded a possible goshawk detection in 1995. District records and databases indicate several incidental goshawk sightings within the Sea Level project area. The two most dependable sightings both occurred in 1996. Wildlife crews surveyed these areas but did not locate a nest or record additional goshawk detections.

## Biological Assessment for Threatened and Endangered Species

### Humpback Whale

Humpback whales are the most abundant of the eight species of endangered whales that occur in Southeast Alaska waters. The other seven species of whales are either present only seasonally as they migrate along the outer coastal areas, or are only occasionally found in the inside coastal waters of Southeast Alaska. Most of the information and data for whales in Southeast Alaska are associated with the humpback whale. Therefore, the following discussion and analysis is primarily based on humpbacks, but it is assumed to be applicable to other species of whales.

The humpback whale population in the North Pacific is estimated at about 1,200, which is thought to represent about 8 percent of the prewhaling population. These whales are regularly sighted in the Inside Passage and coastal waters of the Southeast Alaska panhandle from Yakutat Bay south to Queen Charlotte Sound. Humpback whales feed in Southeast Alaskan waters from about May through December, although some have been seen every month of the year. Peak numbers of whales are usually found in nearshore waters during late August and September, but substantial numbers usually remain until early winter. Baker et al. (1985) estimated that 300 to 350 humpback whales inhabit Southeast Alaska during the summer and fall. Humpbacks summering in Southeast Alaska have been linked to three wintering areas in Mexico, Hawaii, and Japan.

The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids. Important feeding areas include Glacier Bay and adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal and Sitka Sound. Glacier Bay and Icy Strait appear to be important feeding areas early in the season, when whales prey heavily on herring and other small schooling fishes. Frederick Sound is important later in the summer, when whales feed on concentrations of euphausiids. During autumn and early winter, humpbacks move out of the Sound to areas where herring are abundant, particularly Seymour Canal. Other areas of Southeast Alaska may also be important for humpbacks and need to be evaluated. These include Cape Fairweather, Lynn Canal, Sumner Strait, Dixon Entrance, the west coast of Prince of Wales Island, and offshore banks such as the Fairweather Grounds.

Because the humpback inhabits shallow coastal areas, it is increasingly exposed to human activity. Consequently, these whales may be more susceptible to confrontational disturbance, displacement, and loss of habitat from environmental degradation than some other whale species. The recovery plan for humpback whales identified six categories of human impacts on whales: hunting, entrapment and entanglement in fishing gear, collisions with ships, acoustic disturbance, habitat degradation, and competition for resources with humans.



National Forest management activities that may have an affect on whale habitats or populations generally fall into the categories of acoustic disturbance and habitat degradation. These management activities include the development and use of LTFs and their associated camps, the movement of log rafts from LTFs to mills, and the potential development of other docks and associated facilities for mining, recreation, and other Forest uses and activities. Generally, with the development and use of LTFs and other docking facilities for projects, there is an associated increase in recreational boating in the immediate vicinity during the construction and use of the facilities.

Construction and operation of LTFs and other docking facilities are restricted to small, very localized areas of the marine environment. An LTF located at Shoal Coves in Carroll Inlet currently exist in the project area. There is little potential to directly affect whales at this facility. Two potential indirect effects of LTFs, other docking facilities and associated activities have been identified: (1) effects on whale prey species, and (2) disturbances of whales by boat traffic associated with LTFs.

### **Effects on Prey**

Nemoto (1970) noted that euphausiids and gregarious fish are the primary prey of humpbacks. Thirteen species of fish and 57 species of invertebrates were identified as humpback whale prey in Southeast Alaska. Humpbacks studied in Glacier Bay and Stephens Passage-Frederick Sound were found most frequently in areas of high prey density (Wing and Krieger 1983).

Construction and operation of all LTFs and similar facilities require U.S. Army Corps of Engineer, U.S. Environmental Protection Agency, and State of Alaska tidelands permits. The permitting process provides that construction and operation of LTFs maintain water quality in the specific facility locations, and that marine circulation and flushing are maintained. All facilities must be in conformance with permit standards. Although the effects may vary locally, the major effect of leachates (ie. terpene, alpha-conindentric acid, alpha-conindentrin, hydroxymatairesinol, linoletic acid, and dehydroabientic acid) from bark sloughing off stored log rafts is upon invertebrates. Crustaceans, shrimp, and crab larvae seem especially sensitive (Pease 1973).

### **Effects from Disturbance**

Humpback whale response to nearby boating activity varies from no apparent response to pod dispersal, sounding, breaching, evasive underwater maneuvers, and maintaining distance (Baker and Herman 1983, Baker et al. 1982). Disturbance by boat activity has been suggested as one of the possible causes of observed changes in whale distribution in Southeast Alaska. Direct pursuit of whales by boats and frequent changes in boat speed and direction appear to elicit avoidance behaviors more frequently than other types of boat traffic. However, whales may readily habituate to constant and familiar noise (Norris and Reeves 1978). Whales can be commonly found in some areas of Southeast Alaska that have considerable boat traffic. Whether they are habituated to boat traffic has not yet been documented. Adverse effects from current levels of boat traffic have not yet been documented.

Two basic types of boat activity associated with LTFs are log-raft towing and recreational boating by workers. Log-raft towing frequency would vary between camps, seasons, and years, with an average of about once a week during the working season. Tugboats maintain relatively constant speeds and directions during log-raft towing; constant speed and direction elicit less avoidance behavior from whales than other types of boating activity. Log-raft towing routes are generally well established, and adverse effects from log-raft towing have not been documented.

The existing Shoal Cove LTF occurs in a location that receives moderate recreational boating. Recreational boating activity related to this project would likely be indistinguishable from current boating levels. This boating would continue to involve frequent changes in speed and direction and may include some small amount of whale pursuit, if the whales are within sight of an occupied boat. The effect of such recreational activity on whales would depend on many factors such as size of the bay, depth of the waters in the bay, number of boats, and individual behavior responses of the whales. Currently, there is not a quantifiable way to estimate these possible effects.

The following Forest-wide Standards and Guidelines, developed for the Forest Plan (USDA 1997), are incorporated into the Licking Creek EIS by reference:

1. Provide for the protection and maintenance of whale habitats.
2. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and NMFS regulations for approaching whales, dolphins, and porpoise. "Taking" of whales is prohibited; "taking" includes harassing, pursuing, or attempting any such activity.

No adverse effects on whales from implementation of Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but compliance with Forest Plan Standards and Guidelines should partially mitigate any adverse effects on whales resulting from the proposed timber sale alternatives. Generally, the Forest Service has no control over the routes taken by tugboats with log rafts or recreational boating activities.

### Steller Sea Lion

The Steller sea lion (northern) ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, Gulf of Alaska, Southeast Alaska, and south to central California. There is not sufficient information to consider animals in different geographic regions as separate populations. The centers of abundance and distribution are the Gulf of Alaska and Aleutian Islands, respectively. Important food resources include walleye pollock, salmon, eulachon, and cephalopod mollusks. Steller sea lions forage predominantly in nearshore areas and over the continental shelf.

In 1990, because of a large population decline observed over the last 31 years (primarily in the former Soviet Union, Gulf of Alaska, and Aleutian Islands), the NMFS listed the Steller sea lion as a threatened species throughout its range. The number of sea lions observed on certain rookeries from Kenai Peninsula to Kiska Island declined by 63 percent since 1985 and by 82 percent since 1960. Significant declines have also occurred on the Kuril Islands. The cause of overall population decline has not been confirmed. However, incidental mortality of sea lions in commercial fishing gear, shooting by fishermen, and reduced prey species due to commercial fishing operations, have probably contributed significantly to declines.

When the sea lion was emergency-listed as a threatened species in the Federal Register (April 5, 1990), buffer zones restricting human activities were established around rookeries west of 150 degrees west longitude (does not include Southeast Alaska). A recovery team has prepared a recovery plan (National Marine Fisheries Service 1992), and NMFS provides a summary of factors affecting the Steller sea lion (Federal Register April 5, 1991). These factors include: 1) reductions in the availability of food resources, especially pollock, which is the most important prey species for sea lions, 2) commercial harvests of sea lion pups, 3) harvests for subsistence, public display and scientific research purposes, 4) predation by sharks, killer whales, and brown bear, 5) disease, 6) the inadequacy of existing regulations regarding quotas on the incidental harvesting of sea lions during commercial fishing operations, and 7) other natural or human incidences such as shooting adult sea lions at rookeries, haulout sites, and in the water near boats. None of these factors are regulated by or within the jurisdiction of the Forest Service.

Information on population trends in Southeast Alaska is inconclusive, but limited data suggest that Southeast populations are stable or perhaps slightly decreasing. The closest Steller sea lion rookery to the project area is on Forrester Island, west of Prince of Wales Island. There are no known Steller sea lion haul-out locations in the project area; the closest is on the southern tip of Grindall Island, at the south end of Kasaan Peninsula, about 20 miles to the west. It has been designated as critical habitat for Steller sea lions.

Harassment or displacement of sea lions from preferred habitats by human activities such as boating, recreation, aircraft, LTFs, log-raft towing, etc., is a concern with regard to long-term conservation of the sea lion in Southeast Alaska. Forest-wide Standards and Guidelines (USDA 1997) direct the Forest Service to prevent and/or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service, and these are incorporated by reference into the Licking Creek EIS from the Forest Plan. These Forest-wide Standards and Guidelines are as follows:

1. Protect Steller sea lion habitats.
2. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the requirements, consultations, or advice received from the appropriate regulatory agencies for the Marine Mammal Protection Act, the Endangered Species Act, and NMFS Standards and Guidelines for approaching seals and sea lions. "Taking" of marine mammals is prohibited; "taking" includes harassing, pursuing, or attempting any such activity.
3. Locate facilities, camps, LTFs, campgrounds, and other developments at least 1 mile from known haulouts, and farther away if the development is large.
4. Cooperate with State and other Federal agencies to develop sites and opportunities for the safe viewing and observation of marine mammals by the public. Maintain a public education program explaining Forest management activities related to marine mammals in cooperation with State and other Federal agencies.



No adverse effects on sea lions from implementation of Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but compliance with Forest Plan Standards and Guidelines should partially mitigate any adverse effects on sea lions resulting from the proposed timber sale alternatives. Generally, the Forest Service has no control over the routes taken by tugboats with log rafts or recreational boating activities.

### **Pacific Northwest Salmon and Steelhead Trout**

The presence of threatened or endangered Pacific Northwest salmon and steelhead trout is not documented for salt waters near the project area, but their occurrence is possible. Pink, chum, and coho salmon, and steelhead trout occur in project area fresh waters, but chinook salmon do not. A few sockeye salmon are thought to occur each year in project area fresh waters, but no significant runs of sockeye are documented. The application of Forest Plan Standards and Guidelines will be adequate to protect stream fishery resources in the project area. Some increased boating activity may occur between Ketchikan and the project area, and logs may be towed to town, but this increased activity will likely be negligible relative to existing levels of boating activity and should not impact salmon stocks. Based on this information, we anticipate no effects on any of the 13 listed species shown in Table 1.

## **Biological Evaluation for Sensitive Species**

### **Trumpeter Swans**

The breeding range of the trumpeter swan is concentrated along the Alaska Gulf Coast and other wetland areas in central and south central Alaska, and the species winters along the Pacific Coast from the Alaska Peninsula to the mouth of the Columbia River (Bellrose 1980). Each year many trumpeter swans pass through the Ketchikan Area in the spring and fall during migration to and from their breeding grounds. Swans arrive in the area in mid-October as they are migrating south, and those that spend the winter here usually move to large estuaries such as Carroll River once the weather turns cold. Swans typically leave for their breeding area by mid-April. There are no recent records of trumpeter swans nesting on the Ketchikan Area of the Tongass National Forest.

All alternatives fully incorporate Forest Plan Standards and Guidelines for trumpeter swans. These forbid disturbance of trumpeter swans during the nesting, brood-rearing, and wintering periods. If trumpeter swans are observed using habitats within the project area, road building and timber harvesting will not occur within 0.5 miles of these habitat when swans are present (usually from November 1 to April 1). These Standards and Guidelines will protect swan habitats from disturbance. Based on the above information, this project is not likely to adversely affect the swan population in Southeast Alaska.

### **Queen Charlotte Goshawk**

The American Ornithologists Union (AOU) recognizes two subspecies of the northern goshawk in North America: *Accipiter gentilis atricapillus* and *A.g. laingi*, the Queen Charlotte goshawk (AOU 1957). Taverner (1940) first described the darker-plumaged Queen Charlotte goshawk as a distinct race occurring in the coastal temperate rainforests of the Queen Charlotte Islands and Vancouver Island, British Columbia. Webster (1988) found that the Queen Charlotte goshawk occurred from Vancouver Island north to the Taku River near Juneau, Alaska. The northern goshawk and Queen Charlotte goshawk are both identified by USFWS as species of concern throughout their ranges.

In May 1994 the USFWS received a petition from the Southwest Center for Biological Diversity and numerous co-petitioners to list the Queen Charlotte goshawk as endangered pursuant to the Endangered Species Act. In August 1994, the USFWS found that the information presented by the petitioners together with the information in USFWS files was substantial and indicated that listing may be warranted. Therefore, a status review of the species was initiated. After seeking public comments and reviewing available information on the goshawk, a finding was issued in May 1995 that protection under the Endangered Species Act was not warranted for the Queen Charlotte goshawk. Following litigation begun in November 1995, the courts directed the USFWS to reconsider its determination. In August 1997 the USFWS again determined that the Queen Charlotte goshawk did not warrant listing. The petitioners again filed suit against the USFWS for failing to list the Queen Charlotte goshawk, and in July 1999, the Washington, D.C. District Court directed the USFWS to seek better data to support its estimate of the population. In June 2000, the D.C. Circuit Court remanded the decision back to the District Court with direction to make its findings based on the best available data rather than requiring USFWS to provide new data.

## Appendix D

The goshawk is a wide-ranging forest raptor that generally occurs in low densities ranging from 2.4 pairs per 100 square kilometers in Central Alaska (McGowan 1975), to 11.0 pairs per 100 square kilometers in Arizona (Crocker-Bedford and Chaney 1988), although population densities in Southeast Alaska may be much lower (Crocker-Bedford 1992). The most recent estimates of the goshawk population in Southeast Alaska range from 100 to 381 pairs (Crocker-Bedford 1994), to 100 to 800 pairs (Alaska Interagency Goshawk Committee, Report of June 30, 1994).

Generally, goshawks appear to exist in relatively low populations in Southeast Alaska, especially the southern portion. Since 1992, more inventory effort has been spent to find goshawks than any other animal (except fishes) in Southeast Alaska. As of 1998, the cumulative number of known nest areas was 55 throughout all of Southeast Alaska, 18 of these exhibited nesting in 1998. Within the Ketchikan Area (southern Southeast Alaska) 12 nest areas were located between 1987 and 1999. Of these 12 nest areas, monitoring crews located 4 occupied nests in 1997, 3 in 1998, 2 in 1999, and none in 2000. In addition, 1 or more goshawks—but no occupied nests—were detected in 2 nest areas in 1997, 3 in 1998, 5 in 1999, and 1 in 2000.

The primary concern for goshawk population viability is habitat loss due to timber harvest. Research within the range of the Queen Charlotte goshawk demonstrated a significantly greater frequency of relocations of radio-marked goshawks in medium-volume and high-volume mature old-growth forest than the proportions of such habitat within the individual home ranges of the birds under study (Iverson et al. 1996). By contrast, clearcuts were the most avoided of all habitats (Iverson et al. 1996). These radio-telemetry results excluded relocations in the vicinity of nests. Habitat comparisons demonstrated that the vicinities of nests included significantly more forest, and significantly less nonforest, than randomly chosen plots (Iverson et al. 1996).

Reynolds (1983) reported home ranges of *A. g. atricapillus* to be 2,000 to 3,200 hectares (4,942 to 7,907 acres). In Southeast Alaska during the breeding season, the mean use area of radio-marked goshawks was 35,000 acres (214,000 acres maximum) among 17 adult females, and 17,000 acres (48,000 acres maximum) among 16 adult males (Iverson et al. 1996). During the nonbreeding season, the mean use area was 111,000 acres (452,000 acres maximum) among 16 adult females, and 108,000 acres (562,000 acres maximum) among 15 adult males (Iverson et al. 1996). Goshawks are supported (fed in substantial amounts) by only a portion of the habitats present, and typically most of a home range (where trees are small or sparse) provides little or no sustenance to individuals (Crocker-Bedford 1998). Home ranges appear to be larger (Kenward 1982) and more widely spaced in landscapes where less area exists in stands useful for foraging (Crocker-Bedford 1998). Breeding-pair density appears to depend upon the amount of habitat where suitable prey are more abundant and accessible (proper forest structure) where the chance of prey capture in the habitat is worth the time and energy expended (Crocker-Bedford 1998).

The value of clearcut stands for goshawk nesting or foraging is less than any other habitat in Southeast Alaska, and having large portions of early seral forest in a landscape likely reduces cumulative landscape habitat quality (Iverson et al. 1996). Harvesting of units in the Licking Creek project area would increase the amount of early seral forest, thus reducing the cumulative landscape-habitat quality. Goshawk sensitivity to timber harvest resulted in management recommendations to protect nest-site integrity (USDA Forest Service 1990, 1991a, 1992, 1994b). Other management recommendations recognized the importance of foraging areas within the post-fledging area (Kennedy 1989; Crocker-Bedford 1990b; USDA Forest Service 1991a, 1992, 1994b). There is now widespread recognition of the importance of most foraging habitat, including areas far from the nesting site (Reynolds 1989; Crocker-Bedford 1990a, 1994, 1995, 1998; USDA Forest Service 1990, 1994b; Reynolds et al. 1991; Marshall 1992; Iverson et al. 1996).

No known goshawk territories are located within the project area (see page 4 of this BE). Any pairs of goshawks not discovered prior to timber harvest may be affected if the harvest units correspond to key stands of habitat. Any goshawk nest found prior to harvest will be protected using the Forest Plan Standard and Guideline for goshawk nest buffers (USDA Forest Service 1997). Although the buffer is likely adequate if only 3 percent of the old growth of a drainage is harvested in any 1 decade (Iverson et al. 1996), the nest site will likely not be occupied long after timber harvesting if large amounts of harvest occur in the surrounding watersheds (Crocker-Bedford 1990b, 1991, 1994, 1995; Patla 1991, Reynolds et al. 1991, Marshall 1992, Woodbridge and Detrich 1994, Hayward et al. 1995).

It is our determination that the project may affect individual goshawks if timber harvest activities or roads correspond with goshawk nesting stands or key foraging stands. This determination is based on the following factors:

- Goshawks select for (and apparently depend on) medium-volume and high-volume mature and old-growth-forest habitat.
- Goshawks are sensitive to timber harvest, and the habitat value of clearcut stands is very low.



- Harvesting of the units in the project would increase the amount of early seral forest, thus reducing the cumulative landscape habitat quality.

### Mitigation

All units laid out for the project will follow Forest Plan Standards and Guidelines. The project will also follow the Forest Plan strategy for maintaining viable wildlife populations. If the Forest Plan Final EIS (including Appendix N) and ROD are correct in their conclusion that the implemented land-use allocations and Standards and Guidelines are adequate to maintain a viable population of goshawks well-distributed across the forest, then the Licking Creek project will also be consistent with the Forest Service viability regulation and Sensitive Species policy. Even though the cumulative effects of timber harvest in Southeast Alaska are likely to cause individual home ranges and home-range spacing to expand, leading to a reduction in breeding density, it is assumed that consistency with the Forest Plan will achieve the Forest Service viability requirement.

### Osprey

Because their diet consists mainly of fish, osprey are usually found near water. Nest trees are usually broken-top spruce, either live or dead, and western hemlock snags. There are no known osprey nests located on the Ketchikan-Misty Fiords Ranger District. However, osprey have been known to stop at some lakes on the District during migration. Lakes and streams on the project area may provide an opportunity for migrating osprey to rest and feed. No nests have been recorded in or near the project area, and no osprey have been seen during the breeding season within the project area, despite the fact that osprey tend to be more apparent than most species.

The Licking Creek project is not expected to affect nesting osprey because no known nest site occurs in the project area, and because availability of nesting and foraging areas in Southeast Alaska do not appear to be limiting factors. In addition, minimal or no effect on osprey habitat is expected from project activities because uncut buffers will be maintained near streams, lakes, and coastal areas. If nests are discovered in the project area, Standards and Guidelines outlined in the Forest Plan will be followed. Based on this information, the project is not expected to adversely affect osprey.

### Peale's Peregrine Falcon

This species is not listed as endangered or threatened, but is covered by a provision of the "similarity of appearance" which broadens the scope of protection for all peregrine falcons. The nest distribution of this subspecies is closely associated with large seabird colonies located on the outer coasts or nearby islands (USDA Forest Service 1991b), and seabirds are believed to be the major prey of the falcon. In Southeast Alaska, Peale's subspecies of the peregrine falcon (*Falco peregrinus pealei*) nests on the outer islands and on the west coast of Prince of Wales Island. No seabird colonies or known peregrine falcon nesting sites exist near the project area. Based on this information, the project will not affect Peale's peregrine falcons or their habitat.

### Goose-grass Sedge

This sedge is known to occur in the coastal mountains of Alaska and British Columbia and in the Rocky Mountains from Jasper, British Columbia, south to Glacier National Park, Montana. Its range in Alaska is limited to the subalpine of coastal South-central and Southeast Alaska and the Aleutian Islands. Because this plant is expected to occur in subalpine habitats, no effects are anticipated from this project.

### Edible Thistle

Edible Thistle habitat is characterized as wet meadows and open woods along glacial streams. This regionally endemic species is distributed primarily along coastal Oregon, Washington, and British Columbia and barely reaches southern most Southeast Alaska. It is known to exist in two locations in Misty Fiords National Monument (USDA Forest Service 1994a). It is unknown whether this species occurs in the project area. Because timber harvest activities generally avoid wet meadows and stream margins where this species would be expected to occur, no direct effects are anticipated from the project even if the species were to occur in the project area.

### Davy Mannagrass

Davy Mannagrass grows in shallow fresh water and along stream and lake margins. This species is distributed from Southeast Alaska to central California. Its distribution in Alaska is limited to central and southern Southeast Alaska, where it is known to occur in only two documented locations: near Wrangell and on Prince of Wales Island. However, it is easily overlooked and likely to be more widespread in Southeast Alaska (USDA Forest Service 1994a). Forest Plan

## Appendix D

Standards and Guidelines protect most of its habitat from disturbance, though smaller streams may not receive buffers in the project.

Plant populations were found well outside any proposed unit boundary near unit 1. The probability of adverse effects are low because the habitats they occupy are sub-alpine and will not be included in the timber base for harvest. Therefore, the overall risk to this species due to project activities is low; hence the determination is "not likely to adversely affect".

### **Wright Filmy Fern**

Wright Filmy Fern appears to prefer humid shaded boulders, cliffs, tree trunks, and damp woods. This species occurs in coastal areas of Southeast Alaska and British Columbia. The only three documented occurrences of this species in Alaska are from Biorka and Mitkof Islands (USDA Forest Service 1994a). In Alaska, it has been found in small populations on the base of trees and rock outcrops in damp woods. It is unknown if the species occurs in the project area. However, no observations of this species have been documented for the project area. Undetected individuals could be affected. Because so little is known about the distribution of this plant, it is unknown whether affects to undetected individuals in the project area will adversely affect population viability; hence, the determination is "may effect".

### **Truncate Quillwort**

Truncate quillwort grows immersed in shallow waters of lakes and ponds. This rooted-aquatic species is known from a few widely isolated populations on Vancouver Island and South-central Alaska on the Copper River Delta (USDA Forest Service 1994a). Due to its rooted-aquatic nature, this species does not occur in forested areas where timber harvest and road building activities would be concentrated. It is unknown whether this species occurs in the project area. Even if it does exist in the project area, stream and lakeshore buffers, as well as wetland protections, should provide adequate protection for this species. Therefore, no direct effects are anticipated from this project.

### **Calder's Lovage**

This species occurs in British Columbia, Southeast Alaska, and South-central Alaska on rocky cliffs, open boggy or rocky slopes, and edges of coniferous forests. In Alaska it is known to occur in alpine meadow habitats and edges of subalpine mixed-coniferous forest. Previously documented occurrences in Alaska were limited to two areas on Kodiak Island and Dall Island (just west of Prince of Wales Island) in Pleistocene refugia on limestone substrate (USDA Forest Service 1994a). No observations of this species have been documented in the project area, and the species' preferred habitats (alpine meadows and subalpine forest edges) are unlikely to be significantly impacted by timber harvest and road-building activities. Because most individuals are expected to occur in or near wetland habitats, timber-harvest activities are not likely to adversely affect population viability.

### **Bog Orchid**

The bog orchid occurs in wet open-meadow habitat. This species is limited to a small geographic range in southern Southeast Alaska and adjacent British Columbia (USDA Forest Service 1994a). Two occurrences have been documented in Alaska near Pearse Canal and on Dall Island. It is unknown if this species occurs in the project area, however, no observations were recorded during field reconnaissance. This species is not known to occur in forested areas, and its preferred habitat is not likely to be impacted by the project. Therefore, no effects are anticipated from harvest activities.

### **Loose-flowered Bluegrass**

Loose-flowered bluegrass is associated with moist, open lowland woods and open-forest meadows. The distribution of this grass species is scattered between Southeast Alaska and Oregon. Eight previous locations have been documented in Southeast Alaska near Hoonah, Sandborn Canal at Port Houghton, Admiralty Island (USDA Forest Service 1994a), and Gravina Island (Dillman 2000). It is unknown if this species occurs in the project area, however, no observations were recorded during field reconnaissance. Undetected populations could potentially be affected by timber harvest and road building activities in this species's habitats. Therefore, this project may adversely affect individuals or small populations of loose-flowered bluegrass, but such effects are not likely to cause a trend towards listing the species as threatened or endangered.

### **Unalaska Mist-maid**

This herbaceous perennial, a member of the waterleaf family, grows on wet rock outcrops and along shorelines. It is thought to be endemic to the eastern Aleutian Islands, Alaska Peninsula, Kodiak Island, and scattered locations east to Sitka. There are no reliable estimates of its global or statewide abundance, and the only documented occurrence on the Tongass National Forest is from Baranof Island, approximately six miles east of Sitka. This species was not observed

within the project area during plant surveys, and its preferred habitat is not likely to be impacted by the project. Therefore, no effects are anticipated from harvest activities.

### **Queen Charlotte Butterweed**

Queen Charlotte butterweed occurs in shady wet areas and bogs of montane to alpine habitats, open rocky or boggy slopes, and open rocky heath or grass communities. The species is limited to the Queen Charlotte Islands of British Columbia and to disjunct populations in Southeast Alaska and northwestern Vancouver Island (USDA Forest Service 1994a). Five occurrences have been documented in Alaska on Prince of Wales, Coronation, and Dall Islands. It is not known if this species occurs in the project area. No observations of this species were made during field reconnaissance and none have been documented for the project area. Even if this species does occur in the project area, direct effects due to harvest activities are not anticipated to be significant because moist, open habitats are generally avoided for timber harvest. Therefore, this project is not likely to adversely affect the Queen Charlotte butterweed.



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Licking Creek Timber Sale EIS

# Supplement to the BE/BA

*Cathy Tighe*

Prepared by: Cathy Tighe, Wildlife Biologist

*7-7-03*

Date

*Todd Tisler*

Reviewed by: Todd Tisler, Supervisory Biologist

*7-7-03*

Date

## Other Listed Species in Alaska

The purpose of this supplement is to address threatened and endangered species that may occur in Alaska but were not covered in the original Biological Assessment for the Licking Creek Timber Sale Environmental Impact Statement. None of these species are expected to occur in the project area and there are no impacts expected from this project on any of these species. Table S-1 summarizes the species addressed in this document. The text following the table discusses the expected distribution of each of the species in question.

Table S-1. Threatened and Endangered Species that May Occur in Alaska

Common Name	Scientific Name	ESA Status	Summary of BA/BE Finding
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	No effect
Green sea turtle	<i>Chelonia mydas</i>	Threatened	No effect
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened	No effect
Olive Ridley sea turtle	<i>Lepidochelys olivacea</i>	Threatened	No effect
Eskimo curlew	<i>Numenius borealis</i>	Endangered	No effect
Short-tailed albatross	<i>Phoebastria albatrus</i>	Endangered	No effect
Spectacled eider	<i>Somateria fischeri</i>	Threatened	No effect
Steller's eider	<i>Polysticta stelleri</i>	Threatened	No effect
Aleutian shield fern	<i>Polystichum aleuticum</i>	Endangered	No effect
Blue whale	<i>Balaenoptera musculus</i>	Endangered	No effect
Fin whale	<i>Balaenoptera physalus</i>	Endangered	No effect
Sei whale	<i>Balaenoptera borealis</i>	Endangered	No effect
North Pacific right whale	<i>Eubalaena japonica</i>	Endangered	No effect
Sperm whale	<i>Physeter macrocephalus</i>	Endangered	No effect
Bowhead whale	<i>Balaena mysticetus</i>	Endangered	No effect

### Leatherback Sea Turtle

The leatherback sea turtle's range extends from Cape Sable, Nova Scotia, south to Puerto Rico and the US Virgin Islands. During the summer, leatherbacks tend to be found along the east coast of the US from the Gulf of Maine south to the middle of Florida. They are commonly observed by fishermen beyond the 100-fathom curve in offshore waters of Hawaii (NMFS website) and have been recorded in Alaskan waters (ADF&G Wildlife Notebook Series). The project area does not include open waters and should not impact leatherback sea turtles.

### Green Sea Turtle

This species is a warm water resident and only occasionally enters the cold waters of Alaska (ADF&G Wildlife Notebook Series). The proposed project will not impact the preferred habitat of the green sea turtle.

### Loggerhead Sea Turtle

This species is a warm water resident and only rarely enters the cold waters of Alaska (ADF&G Wildlife Notebook Series). The proposed project will not impact the preferred habitat of the loggerhead sea turtle.

### Olive Ridley Sea Turtle

This species is a warm water resident and only rarely enters the cold waters of Alaska (ADF&G Wildlife Notebook Series). The proposed project will not impact the preferred habitat of the olive ridley (Pacific) sea turtle.

### Eskimo Curlew

The Eskimo curlew is a northern Alaska species thought to be extinct. Habitat for this species does not occur in southeast Alaska.



**Short-tailed Albatross**

There are only two breeding colonies of short-tailed albatross that remain active; they are both in Japan. The short-tailed albatross forages widely and has been observed in the Gulf of Alaska along the Aleutian Islands and in the Bering Sea. This species has not been observed in the marine waters of the Inside Passage.

**Spectacled Eider**

Habitat for this species does not occur on the Tongass National Forest. The spectacled eider occupies the coastal waters around Norton Sound, Ledyard Bay, and Russian waters in the late summer and fall and winter in the Bering Sea between St. Lawrence and St. Matthew Islands (USFWS Fact Sheet). The primary breeding grounds are the arctic coastal plains of Alaska and Russia and the Yukon-Kuskokwim Delta.

**Steller's Eider**

Habitat for this species does not occur on the Tongass National Forest. Most Steller's eiders winter in the coastal waters from the Aleutian Islands to lower Cook Inlet, with some in Russia and northeastern Europe (USFWS Fact Sheet). The breeding range is northern Russia and northern and western Alaska.

**Aleutian Shield Fern**

The Aleutian shield fern is endemic to only one island in the Aleutian chain. This species does not occur on the Tongass National Forest.

**Blue/Fin/Sei/North Pacific Right/Sperm Whales**

These whales are generally found in pelagic marine waters. They may be found in outside coastal waters but rarely enter the marine waters of the Inside Passage. The project does not propose to impact outside marine waters.

**Bowhead Whale**

Bowhead whales are a circumpolar, sub-arctic species that winters in the Bering Sea and moves northward for the spring and summer. They do not occur in Southeast Alaska.

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Deerberry: photo Sheila Spores

# **Appendix E**

## **Visual Simulations**





# Appendix E

## Visual Simulations

To help the viewer visualize the impacts of harvest on National Forest lands on the Licking Creek project area, photographs were taken from various viewpoints in Carroll Inlet. These photographs were then scanned into the computer. Adobe Photoshop, a photo-editing tool, was used to draw the approximate size and location of units visible from a given viewpoint. The residual stands resulting from harvest were simulated based on specific silvicultural prescriptions such as percentage of trees retained, size of group selections and other direction. The simulations were also based on observations of some of the limited uneven-aged harvest that has occurred on the Forest and some knowledge of what different levels of retention within a unit look like.

This appendix displays the visual simulations from three viewpoints. The simulations show how a given unit could look after harvest from each viewpoint. Actual on-the-ground situations such as slope, location of reserve trees, streams and topography, size of trees and the species component of the unit could cause the units to look slightly different after harvest.

Each visual simulation viewpoint shows the Existing Condition, the expected condition after the Madder Timber Sale units are harvested, and the expected condition with both the Madder units and the Licking Creek units harvested. The Licking Creek simulations show the "maximum harvest" alternative for that particular viewpoint - Alt. 3 from Viewpoint 1, and Alt. 4 from Viewpoints 2 and 3. Other alternatives not shown for each viewpoint would in fact create less visual impact than shown. The viewpoint locations are shown on Figure E-1.

### Notes on photo-simulations:

Viewpoint 1, Fig. E-2: Illustrates existing condition

Viewpoint 1, Fig. E-3: Alternatives 3 and 5, Units 9, 10, and 12; Unit 12 is not in Alternative 4

Viewpoint 2a, Fig. E-4: Illustrates existing condition

Viewpoint 2a, Fig. E-5: Existing condition including Madder units harvested

Viewpoint 2a, Fig. E-6: Simulates condition with Madder units and Licking Creek Alt. 4, Units 19, 24, and 43 harvested

Viewpoint 2b, Fig. E-7: Illustrates existing condition

Viewpoint 2b, Fig. E-8: Existing condition including Madder unit harvested

Viewpoint 2b, Fig. E-9: Simulates condition with Madder unit and Licking Creek Alts. 4 and 5, Units 40, 44, 63, 67, and 71 harvested

Viewpoint 3a, Fig. E-10: Illustrates existing condition

Viewpoint 3a, Fig. E-11: Existing condition including Madder units harvested

Viewpoint 3a, Fig. E-12: Simulates condition with Madder units and Licking Creek Alt. 4, Units 40, 43, and 50 harvested

Viewpoint 3b, Fig. E-13: Illustrates existing condition

Viewpoint 3b, Fig. E-14: Existing condition including Madder unit harvested

Viewpoint 3b, Fig. E-15: Simulates condition with Madder unit and Licking Creek Alts. 4 and 5, Units 67 and 71 harvested

Licking Creek Timber Sale Final EIS



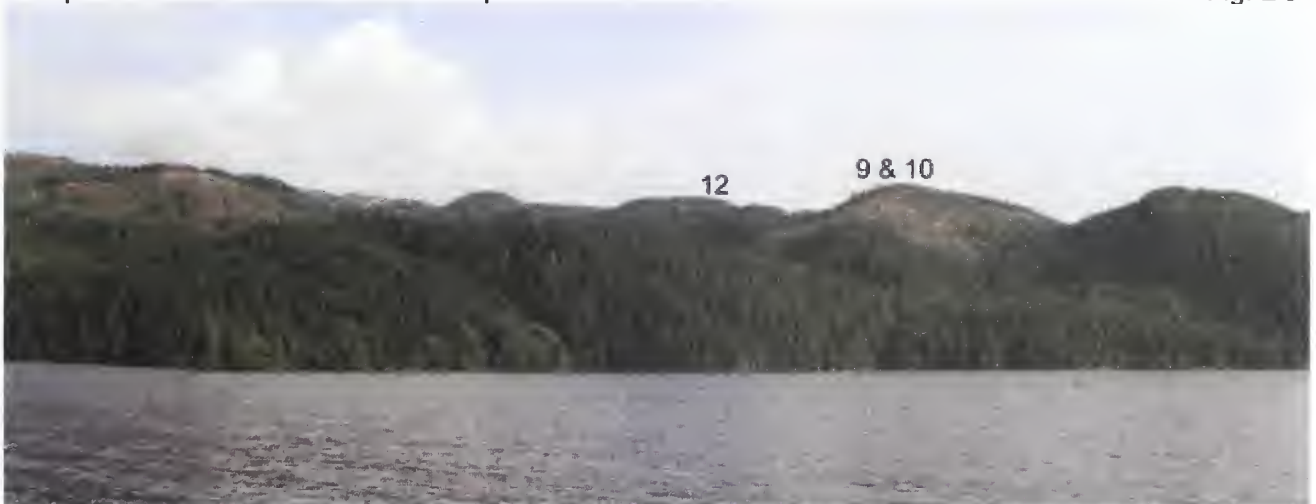
Viewpoint 1 – Existing Condition

Fig. E-2



Viewpoint 1 – Alternatives 3 and 5 Proposal

Fig. E-3





## Appendix E

Viewpoint 2a – Existing Condition

Fig. E-4



Viewpoint 2a – Existing Condition Including Madder Units

Fig. E-5



Viewpoint 2a – Madder Units and Alternative 4 Proposal

Fig. E-6





Viewpoint 2b – Existing Condition

Fig. E-7



Viewpoint 2b – Existing Condition Including Madder Unit

Fig. E-8



Viewpoint 2b – Madder Unit and Alternatives 4 and 5 Proposal

Fig. E-9



Appendix E

Viewpoint 3a – Existing Condition

Fig. E-10



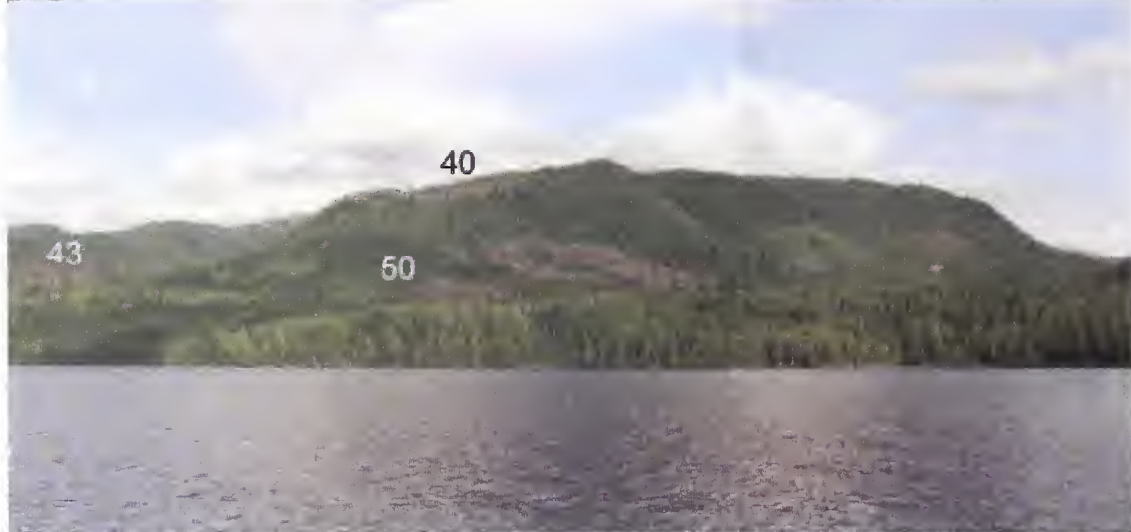
Viewpoint 3a – Existing Condition Including Madder Units

Fig. E-11



Viewpoint 3a – Madder Units and Alternative 4 Proposal

Fig. E-12



Viewpoint 3b – Existing Condition

Fig. E-13



Viewpoint 3b – Existing Condition Including Madder Unit

Fig. E-14



Viewpoint 3b – Madder Unit and Alternatives 4 and 5 Proposal

Fig. E-15







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Licking Creek karst; photo by Alan Murray

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# **Appendix F**

## **Shoal Cove LTF Dive Survey**




# **Appendix F**

## **Shoal Cove LTF Tideland Lease and LTF Dive Survey**

# STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

*DIVISION OF MINING, LAND AND WATER*

  
TONY KNOWLES, GOVERNOR

400 Willoughby Avenue, SUITE 400  
JUNEAU, ALASKA 99801  
PHONE: (907) 465-3400  
FAX: (907) 586-2954

July 26, 2000

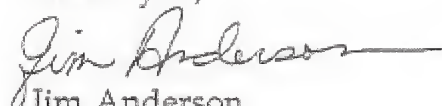
Certified Mail P 380 932 277  
Return Receipt Requested

Steve Zeckser  
USDA Forest Service  
PO Box 21628  
Juneau, AK 99802-1628

RE: Tideland Lease - ADL 106182 at North Shoal Cove

Enclosed is your recorded tideland lease, please file it in a safe location. The lease shall extend through March 14, 2030. Administration of the Forest Service's lease will remain with this office. The annual use fee for this lease is waived per Department Order #145 and Memorandum of Understanding, 99MOU-10-020. Use fee payments will no longer be required. If you have any questions regarding administration of the lease please contact our office at (907) 465-3400 for assistance.

Thank you,

  
Jim Anderson  
Lands Officer

Enclosure: Lease Agreement - ADL 106182

cc: Teresa Trulock, Thorne Bay District w/ copy of lease

*"Develop, Conserve and Enhance Natural Resources for Present and Future Alaskans"*



Underwater Bark Debris Survey  
Shoal Cove Log Transfer Facility  
Revillagigedo Island, Alaska

Submitted to: USDA Forest Service, Region 10  
Ketchikan Area, Tongass National Forest  
Federal Building, 648 Mission Street  
Ketchikan, AK 99901

Prepared by: Craig's Dive Center  
P.O. Box 796  
107 Main Street  
Craig, AK 99921

September 12, 2000

## Introduction:

An underwater survey requested to determine the extent of bark debris accumulation at the Shoal Cove Log Transfer Facility, Revillagigedo Island, Alaska, was performed on September 12, 2000. The purpose of the survey was to satisfy the requirement for a bark monitoring program as specified by the NPDES permit. The protocol for operating a bark monitoring program is given in the new EPA General Permit, which went into effect on March 21, 2000.

## Methods:

Once on site, the layout of the facility is evaluated to best adapt the standard survey method to the individual site characteristics. A permanent reference point location is selected, ideally in the center of the log bundle input structure. The reference point is positioned as close as possible to the exact center of the structure (regardless of type: bulkhead with A-frame, drive-down ramp, low-angle slide, etc.) and close to the estimated Mean Low Low Water (MLLW) depth to facilitate relocation for future surveys. Initially, five transects are established, radiating from the reference point origin at 30-degree intervals. The center transect is located perpendicular to the face of a bulkhead structure, or in line with the centerline of a drive-down ramp/low-angle slide. Additional transects are added if 100 % bark coverage extends more than 15 feet perpendicular to an edge transect. Magnetic compass bearings are selected for the transects by referencing the transects to the center of the log transfer device. The magnetic compass bearing is also the identifying label for that transect.

Each transect is sampled at 15-foot intervals starting from the origin at the permanent reference point. Debris depth measurements are made with a hand-held ruler at the sample point. The measurement is taken by inserting the ruler vertically into the debris until the natural substrate is felt or its location estimated as closely as possible. Periodically, when the confidence level in the measurement decreases due to the substrate type and/or bark amount, the bark depth is confirmed by digging by hand through the bark layer to the natural substrate. Percentage of areal coverage by bark debris is determined by using the ruler, which is randomly dropped at the sample point, as the base of a visually estimated 3-foot square. The proportion of bark cover within that square is then visually estimated.

Sample points are established along a transect until a water depth of 60 feet MLLW is reached or the measured bark debris depth becomes insignificant (usually interpreted to mean that less than one inch of bark depth, less than 10 % cover, and a clear decreasing trend are apparent towards the end of the transect). At each sample location several data points are recorded by the diver: water depth; debris depth; percent coverage of debris; debris composition and character; substrate type; species abundance, condition and diversity; direction and strength of current; visibility; and the presence of any significant operational debris. A qualitative assessment of species abundance is made for the overall survey area.

September 12, 2000

3

Shoal Cove LTF Dive Survey

Photographs are taken of representative sample points along the transects (usually the middle and two side transects) to document substrate, bark debris, algal and animal life, and any other debris/objects that may be of concern. Water depth measurements are taken from a Suunto dive computer with an accuracy of +/- 1%. A Suunto compass attached to a 4-foot measuring ruler is used to navigate the transect compass headings.

The total survey surface area is determined by calculating the total area of triangles formed by adjacent transects, and the total square footage of the debris field area is a summation of all the triangle areas formed by the transects sampled. This figure is converted to acres as required by the guidelines. The calculation method used in this report is outlined in the ADEC publication "**Required Method for Bark Monitoring Surveys under the LTF General Permits**", June 9, 2000. The method for calculating continuous and discontinuous areas also follows this prescribed method.

### **Results:**

Reference Point Location: 55°27.372 N, 131°17.398 W DGPS position. The DGPS position was taken from the boat positioned over the underwater reference point, which is in the middle of the bulkhead, on the substrate at its base.

Weather conditions at survey time were overcast skies, with southwesterly winds at fifteen knots; air temperature was near fifty-five degrees. The diving started at 1305, taking place during an ebbing tide cycle. High tide occurred at 1301 with a height of 14.6 feet (corrected to subordinate station # 1435, Nigeli Point, Carroll Inlet, from the Ketchikan reference station) and a tidal range of 12.9 feet. No appreciable current was experienced during the dive survey. Water temperature was measured at 51 degrees. Underwater visibility was estimated to be 30-40 feet at depth. A mixed freshwater layer extended down to a depth of approximately 20 feet.

The LTF has been decommissioned. A total of 76 sample points were taken on the five transects, and all sample points had some bark debris. The total area covered by the dive survey was 0.9 acres. The area with 100 % bark cover was estimated at 0.6 acres. The area of discontinuous bark cover was 0.4 acres.

Bark Deposition Summary		
Total Survey Area	Area with Continuous Bark Cover	Area with Discontinuous Bark Cover
0.9 Acres	0.6 Acres	0.4 Acres

### **Observations:**

The LTF is situated in a shallow bight approximately midway up the eastern shoreline of Carroll Inlet. The bulkhead fill structure protrudes out from the curving shoreline, which is composed mostly of rock down to about 0 feet MLLW. Subtidally, the substrate is



composed of varying mixtures of sand, silt, and gravel on the moderate slopes of the bight. Two narrow, low-profile bedrock reefs projecting roughly perpendicular to shore were encountered along transect 245.

The zone of deposit covers the entire dive survey area. The zone of 100 % coverage by bark encompasses the slopes and bottom of the semi-circular bowl of the bight shape out to the maximum survey depths, except on transect 005 and 245, where the bark debris became discontinuous five sample points before the transect ends. The depth of bark accumulation was decreasing rapidly on the three transects that ended with 100% coverage. In the areas of deepest bark accumulation, the bark layer exhibited a "jiggling" movement when the measuring stick was inserted into the layer. Overall, the size of the bark debris tended to be small, with patches of larger bark chips and chunks on the surface in some areas. Few sunken logs were observed, and they were in various stages of considerable decay.

My impression of the survey area is that the marine life observed appears to be generally healthy and is not being adversely affected by the bark, other than the smothering effect on sessile benthic infauna when bark accumulation reaches a critical depth. The habitat type was typical of that associated with a sand substrate, except on the fill rock structure and the bedrock reefs on transect 245.

Plant abundance and diversity in the area were low. Large-bladed Laminarians were present, but only as scattered plants attached to rocks, shells, or other hard objects. The encrusting red algae *Lithothamnion spp.* was present on some of the rock surfaces, as were small, unidentified red algae plants.

Molluscan abundance and diversity were moderate. Many bivalve siphons were observed, all was identified as *Tresus sp.* Where observable in the lesser bark accumulations, the shell component of the substrate contained shells of *Clinocardium nuttallii*, *Saxidomus gigantea*, and *Protothaca tenerrima*. *Bankia setacea* feces were noted around the larger wood chunks and logs. A small (3/8<sup>th</sup> inch shell length) unidentified bivalve was observed "hopping" on its muscular foot away from a pursuing *Evasterias troschelii* on the 100% bark debris at sample point 335/2.

Echinoderm abundance and diversity in the area were moderate. The sea star species observed were *Dermasterias imbricata*, *Evasterias troschelii*, *Mediaster aequalis*, and *Pycnopodia helianthoides*. Many individuals of *Parastichopus californicus* were observed on the slopes and the bay bottom, but not in any aggregating pattern.

Crustacean abundance and diversity were moderate. A few *Cancer magister* were observed as individuals scattered over the entire survey area. Another cancer crab, *C. productus*, also was observed. Small crabs of the Majidae family (decorator crabs), commonly observed at LTFs on both the bark and natural substrate, were present in low numbers. Hermit crabs, shrimp, and barnacles were present in the area in low numbers.



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Other invertebrates observed during the survey were unidentified sponges; scattered patches of the tube worm *Spiochaetopterus costarum*; the tunicates *Corella willmeriana*, *Boltenia villosa*, and *Halocynthia aurantia*; thin patches of the bacteria *Beggiatoa* sp.; and unidentified benthic infauna in the sand bottom.

Fish were observed in moderate abundance and diversity in the area. Individuals of *Pholis* sp., *Lumpenus sagitta*, *Hexagrammos stelleri*, *Ronquilus jordani*, *Sebastes* spp., *Rhamphocottus richardsoni*, *Anarrhichthys ocellatus*, and unidentified members of the Cottidae family were observed occasionally over the entire survey area. A small number of flatfish were noted actively swimming above the bottom. A small school of *Cymatogaster aggregata* followed me for much of the survey.

No significant man-made debris was observed other than the typical, minor operational debris.

### Conclusion:

The 100% bark zone remains under the maximum size limit cited in the general permit. The semi-circular shoreline topography appears to focus most of the debris accumulation in the area directly in front of the bulkhead, and creates a defined area in which the 100% bark cover area will never reach the one-acre limit, at least within the 60 foot MLLW depth limit.

If there are any questions regarding this report, please contact me at 907-826-3481 or by email at [craigdiv@aptalaska.net](mailto:craigdiv@aptalaska.net). Thank you for allowing Craig's Dive Center to be of service.

Respectfully submitted,

Craig Sempert  
Diver

December 8, 2000

**TABLE 1**  
**Transect Data**

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
Ref. Pt.	5	<1	10	Rk, Gr
035/1	4	3	90	Rk, Gr
035/2	2	<1	25	Rk, Gr
035/3	0	<1	10	Rk, Gr
035/4	1	T	T	Rk, Gr
035/5	0	T	T	Sa, Gr, Rk
035/6	0	<1	10	Sa, Gr
005/1	9	<1	75	Gr, Sa
005/2	12	6	25	Gr, Sa
005/3	16	1	100	Gr, Rk
005/4	19	27	100	Sa, Gr
005/5	23	11	100	Sa, Gr
005/6	27	4	100	Sa, Gr
005/7	29	4	100	Sa, Gr
005/8	33	3	100	Sa, Gr
005/9	39	3	90	Sa
005/10	43	3	90	Si, Sa
005/11	46	<1	75	Si, Sa
005/12	49	<1	25	Si, Sa
005/13	51	<1	25	Si, Sa
335/1	12	4	100	Gr, Sa
335/2	17	30	100	Gr, Sa
335/3	21	24	100	Sa, Gr
335/4	26	11	100	Sa, Gr
335/5	30	6	100	Sa, Gr
335/6	34	4	100	Si, Sa
335/7	39	4	100	Si, Sa
335/8	43	2	100	Si, Sa
335/9	47	2	100	Si, Sa
335/10	52	2	100	Si, Sa
335/11	57	2	100	Si, Sa
305/1	11	4	100	Sa, Rk
305/2	17	12	100	Sa, Gr
305/3	26	21	100	Sa, Gr
305/4	31	12	100	Sa, Gr
305/5	38	8	100	Si, Sa

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TABLE 1 – cont.  
Transect Data

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
305/6	44	7	100	Si, Sa
305/7	51	6	100	Si, Sa
305/8	55	4	100	Si, Sa
305/9	60	4	100	Si, Sa
275/1	8	11	100	Gr, Sa
275/2	13	4	75	Gr, Sa
275/3	20	12	100	Sa
275/4	28	17	100	Sa
275/5	34	16	100	Si, Sa
275/6	40	13	100	Si, Sa
275/7	45	11	100	Si, Sa
275/8	51	8	100	Si, Sa
275/9	54	6	100	Si, Sa
275/10	60	4	100	Si, Sa
245/1	6	6	100	Gr, Sa
245/2	7	3	100	Gr, Sa
245/3	13	1	50	Gr, Rk
245/4	12	1	50	Gr, Rk
245/5	16	14	100	Sa
245/6	21	12	100	Sa
245/7	24	9	100	Sa
245/8	26	5	100	Si, Sa
245/9	28	3	100	Si, Sa
245/10	31	4	100	Si, Sa
245/11	32	4	100	Si, Sa
245/12	33	<1	100	Sa, Gr
245/13	32	<1	90	Sa, Gr
245/14	31	<1	75	Sa, Gr, Rk
245/15	28	<1	75	Sa, Gr, Rk
245/16	25	<1	10	Sa, Gr
215/1	3	3	100	Sa, Rk
215/2	2	1	75	Rk, Sa
215/3	2	<1	50	Rk, Sa
215/4	3	<1	50	Rk, Sa
215/5	4	<1	25	Rk, Sa
215/6	9	1	75	Rk, Sa
215/7	12	3	100	Sa

**TABLE 1 – cont.**  
**Transect Data**

Transect/Sample Pt.	Depth from MLLW	Debris Depth (in)	Percent Coverage	Substrate Type
215/8	11	1	90	Sa
215/9	13	1	90	Sa
215/10	12	<1	75	Sa

Key to Substrate Type	
Brk	Bedrock
Gr	Gravel
Rk	Rock
Sa	Sand
Sh	Shell
Si	Silt



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Table 2

Species Abundance		
L = Low    C = Common    A = Abundant		
Scientific Name	Common Name	Abundance
<b>Plants</b>		
<i>Rhodophyta</i> sp.	Red algae	L
<i>Lithothamnion</i> spp.	Crustose red algae	L
<i>Laminaria saccharina</i>	Sugar kelp	L
<i>Agarum clathratum</i>	Sieve kelp	L
<b>Invertebrates</b>		
<i>Beggiatoa</i> sp.	Bacteria	L
Porifera spp.	Unidentified sponge	L
Benthic infauna	Unidentified benthic infauna	C
<i>Spirochaetopterus costarum</i>	Tube worm	L
<i>Bankia setacea</i>	Ship worm	L
<i>Clinocardium nuttallii</i>	Cockle	L
<i>Saxidomus gigantea</i>	Butter clam	L
<i>Protothaca tenerrima</i>	Littleneck clam	L
<i>Tresus</i> sp.	Horse neck clam	C
<i>Dermasterias imbricata</i>	Leather star	L
<i>Evasterias troschelii</i>	False ochre star	L
<i>Mediaster aequalis</i>	Red star	L
<i>Parastichopus californicus</i>	Sea cucumber	L
<i>Pycnopodia helianthoides</i>	Sunflower star	L
<i>Evasterias troschelii</i>	False ochre star	L
<i>Cancer magister</i>	Dungeness crab	L
<i>Cancer productus</i>	Red rock crab	L
<i>Pandalus</i> sp.	Shrimp	L
<i>Balanus</i> spp.	Barnacle	L
<i>Pagurus</i> spp.	Hermit crab	L
<i>Hyas hyratus</i>	Lyre crab	L
<i>Oregonia gracilis</i>	Graceful decorator crab	L
<i>Corella willmeriana</i>	Solitary tunicate	L
<i>Halocynthia aurantia</i>	Sea peach	L
<i>Boltenia villosa</i>	Spiny-headed tunicate	L

Table 2 (cont.)

<u>Species Abundance</u> L = Low    C = Common    A = Abundant		
Scientific Name	Common Name	Abundance
<u>Vertebrates</u>		
<i>Cottidae</i> spp.	Sculpin	L
<i>Pleuronectidae</i> spp.	Righteye flounders	L
<i>Bothidae</i> spp.	Lefteye flounders	L
<i>Platichthys stellatus</i>	Starry flounder	L
<i>Hexagrammos decagrammus</i>	Kelp greenling	L
<i>Sebastes</i> spp.	Rockfish	L
<i>Pholis</i> spp.	Gunnel	L
<i>Cymatogaster aggregata</i>	Shiner perch	L
<i>Coryphopterus nicholsi</i>	Blackeye goby	L
<i>Rhamphocottus richardsoni</i>	Grunt sculpin	L
<i>Anarrhichthys ocellatus</i>	Wolf eel	L
<i>Lumpenus sagitta</i>	Pacific snake prickleback	L
<i>Ronquilus jordani</i>	Northern ronquil	L

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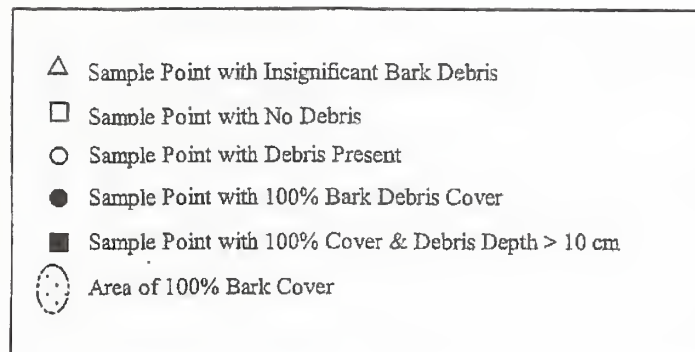
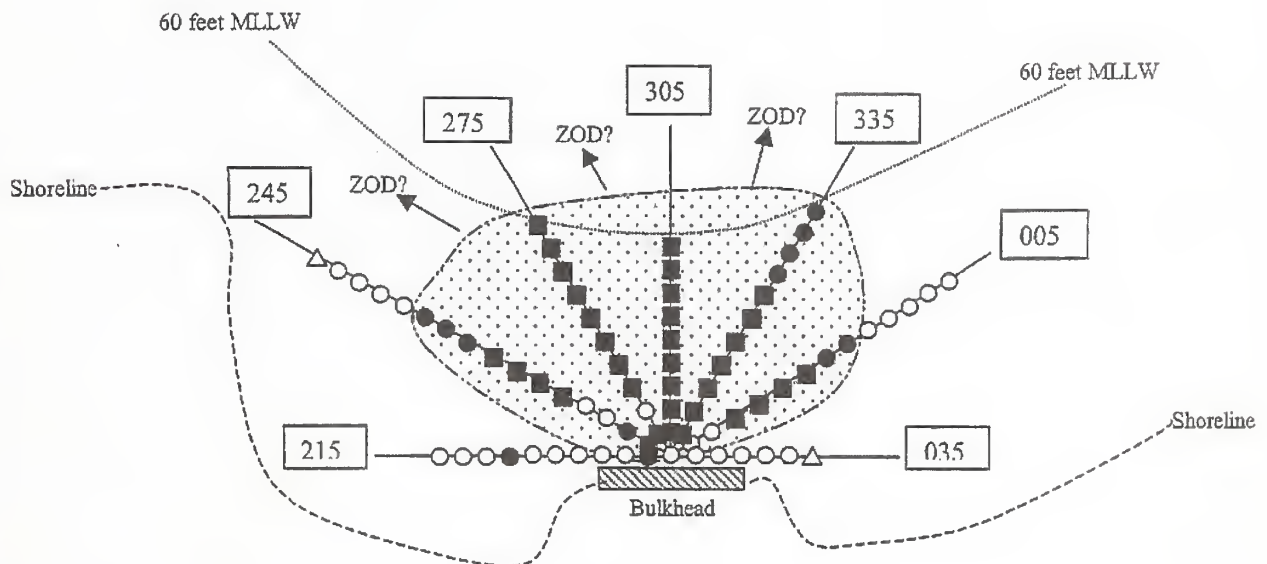


Diagram Not To Scale



## Carroll Inlet



## 9/12/00 Shoal Cove LTF Dive Survey

### Photograph Key

Photo Number	Transect/ Sample Pt.	Description
1	Reference Point	Little bark at base of pilings
2	005/1	Bark mixed with silt, sand, and gravel
3	005/2	Some bark in rock crevices
4	005/3	Sea star on surface of 100% bark layer
5	005/4	100% bark layer
6	005/5	Shell, tube worms in 100% bark layer
7	005/6	Sea cucumber, more shell in 100% bark layer
8	005/7	Anchor creating a reef for a variety of life
9	005/9	Now into discontinuous bark cover
10	005/11	Now into discontinuous bark cover
11	305/1	Kelp on rock surrounded by bark
12	305/2	Old eroded log, wire in 100% bark layer
13	305/3	Kelp attached to rock, bacteria on 100% bark layer
14	305/4	Sea cucumber on 100% bark layer
15	305/5	Some silt on 100% bark layer
16	305/7	More silt on 100% bark layer



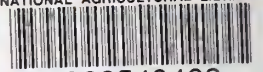


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